



PROBATIONARY ESSAY

ON

OSTEO-ANEURISM.

.

*To the Royal College of Surgeons
of England from the Author*

PROBATIONARY ESSAY

ON

OSTEO-ANEURISM,

OR

ANEURISM OF THE ARTERIAL CAPILLARIES
OF BONE;

SUBMITTED,

BY THE AUTHORITY OF THE PRESIDENT AND HIS COUNCIL,
TO THE EXAMINATION OF THE

Royal College of Surgeons of Edinburgh,

WHEN CANDIDATE

FOR ADMISSION INTO THEIR BODY,

IN CONFORMITY TO THEIR REGULATIONS RESPECTING THE

ADMISSION OF ORDINARY FELLOWS.

BY

P. D. HANDYSIDE, M. D.

FORMERLY SENIOR PRESIDENT OF THE ROYAL MEDICAL SOCIETY.

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TO

FREDERICK TIEDEMANN,

PROFESSOR OF ANATOMY AND PHYSIOLOGY IN THE UNIVERSITY
OF HEIDELBERG,

&c. &c.

THIS ESSAY IS INSCRIBED,

AS A TRIBUTE TO HIS EMINENCE AS AN ANATOMIST,

AND IN ACKNOWLEDGMENT OF

THE BENEFITS RECEIVED FROM HIS INSTRUCTIONS

BY HIS LATE PUPIL

THE AUTHOR.

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ON OSTEO-ANEURISM.

INTRODUCTION.

As a subject for a Probationary Essay, I have selected an uncommon yet important disease of the Osseous Tissue in Man ; in the hope that it may not prove unacceptable, to collect and compare all the cases which are recorded, of a disease whose nature, so far as I can learn, has not been investigated in any systematic work on Surgery.

The comparatively rare occurrence of the malady in question, together with the difficulty of attaining an accurate knowledge of its character from dissection, may account for its not having received, from writers on Surgery, that full examination which its importance humbly appears to me to demand. A further reason for this silence regarding the disease which I have here called *Osteo-Aneurism* *, may be, that, on occasions when this disease has

* BRESCHET, the distinguished French Anatomist, has observed, (*Répertoire Général d'Anatomie et de Physiologie Pathologiques, et de Clinique Chirurgicale*, Tom. ii. p. 142 ; Paris, 1826), " the word Aneurism has given rise to numerous altercations, discussions, and erroneous deductions : " still, I hope to prove the appellation I have given in the text to the disease under consideration, to be perfectly just and warrantable, and to be fully borne out by analogy. Professor SYME of this University, in his *Principles of Surgery*, p. 162, under the title of Aneurism of Bone, directs the attention of the Profession to M. BRESCHET's valuable cases of this disease.

really existed in the patient, it has been generally looked upon as some other more common affection, and been treated as such, from sufficient attention not having been paid to its pathology.

The few instances of this disease in which its history and phenomena have been recorded, have appeared under a wide diversity of titles in medical works: at one time having been described as "Bloody Tumours *;" at another time as "Anomalous Diseases †;" now included under the head of "Ruptured Veins ‡, and again under those of "Aneurism of Pott §," "Fungus Hæmatodes ||," "Osteo-Sarcoma" or "Medullary Exostosis ¶," "Varicose Tumours **," "Inflammation of the Veins of Bones ††," "Inflammation of the Bones themselves ‡‡," and finally, as "Extraordinary Cases, having no parallel in the records of Pathological Anatomy §§," &c. &c. These inconsistent appellations at once demonstrate the disease not to have

* See BOYER, *Traité de Maladies Chirurgicales*, etc. Tom. ii. p. 318, 8vo, Paris, 1818; BRESCHET's *Memoir*, op. cit. entitled "Observations et Réflexions sur des Tumeurs Sanguines;" and Mr BENJAMIN BELL's *Treatise on the Diseases of the Bones*, p. 153, 12mo, Edin. 1828.

† HODGSON on the Diseases of Arteries and Veins, p. 448, 8vo, Lond. 1815, &c.

‡ ELSE, in the *Med. Obs. and Inq. Obs.* ii. p. 173, 8vo, Lond. 1767.

§ PELLETAN. *Clin. Chirurg.* Tom. ii. p. 43, who, overlooking the important difference between his third case of Osteo-Aneurism, hereafter given, and a remarkable case of disease narrated by PERCIVAL POTT, (*Chirurg. Works*, vol. iv. p. 223, EARLE's edit. 1808), says of the former, "Si l'on exige qu'il designe la nature complexe de la maladie, je l'appellerai l'Aneurisme de POTT."

|| BOYER, op. cit. 320 *†.

¶ COOKE, in the Notes to his edition of MORGAGNI, vol. i. p. 235, 8vo, Lond. 1822; also BRESCHET, op. cit. p. 165.

** BRESCHET, op. cit. 165.

†† BRESCHET, op. cit. 165-173.

‡‡ BRESCHET, p. 165.

§§ Dr CUMIN of Glasgow, in the *Med. and Surg. Journ.* vol. xxiii. p. 20.

* † FREER'S *Observations on Aneurism*, p. 25, 8vo; Birmingham, 1807.

been understood. And this confusion of terms, employed to designate the cases of this malady which have hitherto been described, warn the young surgeon that he will, in the course of practice, meet with many cases which he will be puzzled to place under any of the known classifications of disease.

It is hoped, then, that an attempt to discriminate more particularly the present disease, so as to prepare for ultimately giving it its proper place in our Systems, may meet with indulgence from those to whom this paper is submitted.

In the outset of this inquiry, I may observe, that in investigating the organic alterations of the Osseous system, our knowledge of the pathology of the soft parts affords us but few analogical applications to that of the denser tissue; for upon minutely comparing the phenomena of the particular affections of both these systems, any resemblance between them in their morbid actions will appear to be but slight: "*les altérations organiques dont les Os sont susceptibles,*" says BOYER *, "*doivent être étudiées dans les Os eux-mêmes.*"

Although, then, the difference of structure, and the consequent modifications of vital properties in the Bones and soft parts, prevent us associating and identifying the nature of the diseased action occurring in them, there exist, however, certainly many circumstances common to the diseases of the two tissues; of which an illustration is furnished by the disease before us. Thus there is (as I hope to prove) an exact correspondence between Osteo-Aneurism and Aneurism of the arterial system in general; and the con-

* BOYER, Op. Cit. Tom. iii. p. 544.

nexion observable in the details I shall give of these diseases, hitherto accounted different, is so intimate, as may lead to the presumption of their phenomena being really analogous, in so far as the particular tissue of the body which they both affect is concerned.

It will be proper, before describing Osteo-Aneurism, to state the grounds for regarding this morbid affection of the arteries as a distinct disease. I shall, accordingly, relate fully all the cases of it which I have been able to discover in turning over the records of Medical Science: and having thus laid down a foundation of facts, I shall state the opinions I have drawn from them, regarding the pathology of the disease.

PART I.

NARRATIVE OF CASES.

THE earliest mention made of a disease agreeing in character with the affection of the Bones now under examination, occurs in the four following narrations by the older authors.

SCULTETUS* relates a case of Ulceration of the head of the Tibia to such an extent as to expose to view a nutritious artery of that bone in an Aneurismatic condition, pulsating among the marrow :

“ De arteria pulsante in medulla Tibiæ observata.—Quidam Calcearius in platea, quæ à sordium mole nomen habet, inveterato et maligno affectus ulcere, in superna Tibiæ parte immediatè infra genu, quod non solum musculosam et membranosam depascebatur substantiam, sed ipsum os adeò corrodebat et exedebat, ut ipsa tibiæ medulla prodiret in conspectum ; in qua medulla singulis deligationibus arteriam pulsantem mecum varii visu lustrabant Medici, qui oculati hujus motus testes sunt.”

MORGAGNI†, in the following quotation which I have made from his valuable register of Medical facts and observations, gives the details of a certain morbid condition of the

* SCULTETUS (JOAN.), *Armentar. Chirurg. Obs.* lxxv. p. 642. 2 vols. 8vo. Amst. 1741.

† MORGAGNI, de *Sedibus et Causis Morborum*, Epist. lii. § 38-9, p. 112-3. 3 tom. 4to. Ebrodun. 1779.

interior of Bone, presenting the character of Osteo-Aneurism. He himself, indeed, entertained the opinion that the nutrient arteries of the bony tissue were in an Aneurismal state.

“ Mulier per marmoreas scalas retrorsum ruens, occiput vehementer aliserat; sed præter brevem, levemque adeo stuporem, ut mox per se redire domum potuerit, modicamque, et quæ cito evanuit, sugillationem, nihil mali inde retulit. Post aliquot tandem menses in percussa capitis sede tumor apparuit avellana haud major: qui cum dolorem afferret nullum a muliere neglectus, sensim increvit, ut tertio circiter jam exacto anno, esset magnus: quo tempore a Chirurgis quibusdam pro cystico subcutaneo tumore habitus, ut qui neque cutis colorem mutasset, et sine dolore premi posset, ab ipsis, nisi mulier renuisset, fuisset exsectus. Paulo post doloribus ægra torqueri cœpit, qui a tumoris sede incipientes, per cranium ferme universum ita extendebantur, ut hoc funibus quasi quibusdam sibi constringi videretur. Non erant illi quidam assidui, nec semper æque graves, nonnunquam tamen graves adeo, ut mentis perturbationem inducerent: quo autem magis procedebat tempus, eo crebriores, et vehementiores fiebant. Per hæc ad annum a casu ventum est sextum. Quo elapso, ecce de improvviso apoplexia ingruit, paucasque intra horas mulierem perimit.

“ Tumore aperto, ejus cavum sanguine plenum inventum est pene atro, nec concreto solum, sed tam denso, ut arreptus digitis secutus sit universus, tunc demum portione aliqua fluidi sanguinis exeunte. Id vitium, detractis integumentis, incipere compertum est a percussa olim parte, idest superiore ossis occipitis ad latus sinistrum pergere autem per os sincipitis ejusdem lateris usque eo, ut tribus, haud amplius, transversis digitis a coronali sutura distaret. Occupabat insuper dextri ossis sincipitis partem, ut omnis ca-

ries sex digitos in latum, septem, eoque amplius in longum pateret. Qua ossa non erant omnino pertusa, reticularis ossea apparebat substantia, e cujus exteriori facie attollebant se passim lamellæ osseæ, pleræque ut crassiuscula charta tenues, sed durissimæ omnes et acutissimæ: quæ foliaceos quasi fungos, alios alia amplitudine, per vegetationem quandam osseam enatos, non ineleganti spectaculo referrent. Dura meninx facta erat crassissima toto eo spatio quo vitiato cranio subijciebatur, hujus autem parti quæ icta olim fuerat, multo arctius adhærebat. Per eandem meningem repentina vasa cum a dextris naturalem servarent modum, a sinistris valde erant turgida, et dilatata, eorumque insana, quæ eodem in latere supererat, calvariæ parte vestigia spectabantur multo quam a dextris, ampliora, et profundiora. Quod reliquum est, vasa quoque plexus choroidis sanguine multum distenta, et seri effusi portio aliqua sub cerebri basi reperta est.

“Cæterum in ea erat opinione GARELLIUS, violatas, compressasve ictuum occasione arteriolas quæ non modo inter cranii tabulas, sed et intra alia sint ossa, dilatari, et in aneurysma distendi, et cariem vel priusquam rumpantur, ut adsita ossibus aneurysmata solent, vel rupta parere. In eamque opinionem adductus fuerat a tribus quæ cum descriptio cranio asservabat, femoris ossibus. Quorum unum tumorem ostendebat in quem dilatatum fuerat ad pugni magnitudinem, carie exesum passim atque pertusum, tresque osseas emittentem productiones, quarum maxima digitum longitudine, et crassitudine æquabat; simul autem foramen per quod arteria os subibat, perangustum alias, in eo osse adeo amplificatum, ut nullo negotio minimum admitteret digitum. Ossa duo reliqua præter fracturam, quæ olim præcesserat, consolidatam, affectum carie habebant humorem, et pro arteria insculptum ossi foramen

pariter dilatatum. Itaque hoc morbi genus necdum quantum mereret, illustratum, explicatumque censebat."

In the Museum of ALBINUS, are two preparations bearing considerable resemblance to Osteo-Aneurism. I shall extract from SANDIFORT * the information that is preserved regarding them, though it is matter of regret, that with the previous historical details in each case, we are left unacquainted.

" Pars Ossis Humeri hominis adulti per longitudinem media dissecta, impletis arteriis. Arteria major, per canalem ossis, majorem partem dissectum, ad medullam penetrat. Medulla arteriarum impletarum plena. Capacitas ossis, ubi excussa medulla. In osse secto arteriæ subtiles impletæ. (Annot. Academ. lib. iii. cap. 3. tab. 5. fig. 2.)

" Portiones Ossis Humeri hominis adulti, effractæ ad capacitatem usque, quæ medullam continet. Arteriæ impletæ sunt, ex quo medulla tota rubet, vasorum impletorum plena. Nullum periosteum internum. In periosteo externo vasa, eoque detracto, ramuli eorum in os penetrantes, ramulique impleti in crassitudine ossis, ubi effractum est."

Among the contributions of the Medical writers of a more recent date, the first well authenticated instance of Osteo-Aneurism, is found reported by Mr ELSE†.

* Museum Anatomicum, &c. JOANNIS SANDIFORT, vol. i. p. 64., folio. Lugd. Batav., 1723.

† Med. Obs. and Inq. vol. iii. Obs. ii. p. 169. Lond. 1767. BRESCHET (op. cit. p. 173.) comes to the conclusion that all the three cases related by ELSE, in his memoir, are examples of "L'inflammation des Veines qui entourent les Os." It would plainly appear, however, that the second (that quoted in the text) is an instance of Osteo-Aneurism. In the first and third cases, the bones were not implicated in the disease. Indeed, in both of these we have examples of Aneurism from Anastomosis of the soft parts. Sir C. BELL, (Surg. Obs. vol. i. pp. 366, 408,) in

“ A few months ago, a woman was received into the hospital, for a large swelling in the calf of the leg, which was judged to contain blood. On opening it, fluid blood escaped, mixed with a serous matter ; and the Surgeon, by introducing his finger, pressed out some of that mass, proper to these tumours. He observed, upon pressing his finger onwards, that the upper part of the Fibula, for about two inches, was quite deficient, having been totally dissolved by the extravasated blood. Upon this it was determined immediately to amputate the leg. It was afterwards injected by the artery, and the injection, as I myself saw, had passed through the posterior Tibial and Fibular arteries, and into the anterior Tibial artery.” As proofs evincing this to be truly a case of Osteo-Aneurism, I would urge the particular contents of the tumour, the condition of the bone, and the free passage of the injection through the principal arteries of the leg without extravasation. This, however, shall be afterwards more fully insisted upon.

Mr PEARSON * has related very accurately a case of this disease. “ John Mallet, a tall thin man, aged sixty-three years, had for a long time pursued a laborious occupation, and enjoyed a good state of health. In December 1784, as he was walking, he suddenly experienced a sensation in his left knee, as if something had broken within it. The pain

treating of soft Cancer or Fungus Hæmatodes, thinks that ELSE has, in the three cases referred to, afforded a very perfect description of that common disease. But in opposition to this view, it may simply be remarked, that the chief characteristic of Fungus Hæmatodes, as given by Sir C. BELL himself, (p. 409,) viz. its power of destroying the coats of Arteries as well as of Veins, and reducing every structure with which it comes in contact, is wanting in ELSE's cases ; in all of which the arteries were found perfectly healthy.

* Medical Communications, vol. ii. p. 95. 8vo. Lond. 1790, with a Drawing.

attending this was so acute, that for some minutes he was unable to move from the spot ; but afterwards he walked home, though with great difficulty. Supposing this complaint to be occasioned by a sprain in walking, he remained at home for about fourteen days, contenting himself with the application of vinegar and other simple remedies to his knee ; and at the expiration of that time found himself so much relieved, that he attempted to carry a heavy load upon his shoulders. This attempt, however, occasioned a return of the pain with great violence, and he was obliged to be carried home in a coach. About this time, an inconsiderable circumscribed tumour appeared below and on one side of the Patella. When this swelling was pressed with the finger, it yielded a little, and there was an evident pulsation within it.

“ In the month of March 1785, he was admitted into the Westminster Hospital, under the care of Mr WATSON, who has informed me, that from the first time he examined the disease, he had no doubt of its being an Aneurism, although some of the circumstances attending it appeared uncommon. There was not the least fulness, pain, or rigidity in the ham, and the tumour seemed to be supplied from some branch of the popliteal artery, which had determined him to perform the operation for an Aneurism, if the patient would have consented. The poor man was at this period in so much torture, that he could not stand upright. The veins of the whole limb were much enlarged and painful ; but by the use of fomentations, cataplasms, and purgatives, the pain subsided, the veins returned to nearly their usual size, and the man found himself so much at ease, and had so well recovered the use of his leg, that he walked about the Ward without pain or fatigue. The tumour was now

so far diminished, that he was discharged from the Hospital at his own request.

“ Soon after this he applied for relief at the Public Dispensary, and came under my care July the 13th. At this period, there was a large prominent tumour at the interior part of the Patella, which by passing under the ligament of that bone, was apparently divided into two swellings. The ligament was on the stretch, and the apex of the Patella so much elevated, as to press firmly against the skin. The integuments were not discoloured, but the cutaneous veins upon the surface of the tumour had again assumed a varicose appearance. There was a strong and regular pulsation evident to the eye, and synchronous with that of the Radial artery. The pain was unremitting; the whole leg was become œdematous; the foot was cold; his countenance appeared pale and dejected; and his health in general was much impaired.

“ The appearance of the limb led me to suppose with Mr WATSON, the disease to be an Aneurism, the seat of which I concluded to be the anterior Tibial artery. At this period of the case, amputation seemed to be the only means from which relief could be expected. The age of the patient, and the impaired state of his health, rendered the event of such an operation extremely precarious; but as he and his friends, though apprized of the danger, were anxious for the removal of the limb, I performed the operation on the 25th of July, with the concurrence of Mr WATSON. The amputation was made above the knee by the double incision. As soon as the great vessels were divided, a considerable quantity of blood streamed out from that part of the crural artery which was below the incision, and the sac immediately became flaccid. For some days the patient seemed to be going on well; and a considerable

portion of the stump was healed by the first intention, when a diarrhœa came on with hectic symptoms, and he died at the end of five weeks after the operation.

“ The arteries and veins of the amputated limb were injected in the usual way, on a supposition that the disease was an Aneurism. I began by dissecting the popliteal artery downwards, and excepting the reticulated appearance of the cutaneous veins, and a very considerable enlargement of their diameters, all the bloodvessels seemed to be in a natural state. The two principal posterior divisions of the artery were not larger than usual. I then followed the course of the anterior Tibial artery, by sawing off a portion of the Tibula, but observed nothing preternatural. As the sac before mentioned was quite turgid, it was opened at its anterior part, and found to contain red injection, coagulated blood, and some matter of a very offensive smell. On removing the whole of these substances, I was greatly surprised to find, that the seat of the disease was in the bone itself. The whole internal substance of the head of the Tibia was destroyed, forming an excavation capable of containing more than half a pint of fluid. The whole anterior and posterior portions of this part of the Tibia were completely removed; and the fluids had been confined by a sac resembling, externally, thickened Periosteum, and lined internally with a substance similar to that found in Aneurismal tumors.

“ The two lateral portions of the Tibia remained, but the external cortical plate of bone was so thin as to be transparent. Although the caries was so extensive, no matter had been effused within the capsular ligament, and the joint was free from disease; as were likewise the Patella and Fibula. When it is considered that the posterior portion of the tumour pressed against the bloodvessels in the ham, and

that there was no bone there nor at the anterior part of the tibia, the cause of the pulsation mentioned above may be easily understood. As the Sac was filled with red injection, there appears to be sufficient reason for presuming, that one or more arteries opened into it. But it may very properly be asked, whether the rupture of an artery gave origin to the disease; or whether the erosion of bloodvessels was only a consequence of an original affection within the bone?"

SCARPA *, in his beautiful and accurate work, has described at length, as well as given a drawing, of a case very similar to that just related. It is entitled, " Singular case of Aneurism situated upon the Spine of the Tibia, in the vicinity of the Knee."—" A young country man, 24 years of age, apparently of a good constitution, had, for a long time, had a pulsating tumour upon the spine of the left Tibia, about six fingers below the Patella. The bone of the Tibia formed the base of this tumour, and therefore it was hard at its root; but at the apex, and above the spine of the Tibia, it was soft, and, on applying the hand there, a strong pulsation was felt in it, which raised the hand as a large Aneurism does. There was some swelling also behind the Tibia, and in the upper part of the calf of the leg; but the greatest elevation of the pulsating tumour was, properly speaking, upon the spine of the Tibia.

" On questioning the patient with regard to the origin of his disease, he said, that about seven years ago, an ox had struck him with its horn at that plaec; that afterwards a small tumour had appeared there, which, however, some days after, disappeared; that, for three years subsequent to this accident, he had not felt any inconvenience in that part; that, after that time, he had perceived in the same

* ANTON. SCARPA, sull' Aneurisma, fol. Patav. 1804; translated by WISHART, Edin. 1808, p. 439.

place, or on the spine of the Tibia, a pulsating and indolent tumour, the cause of which had been ascribed to a tight ligature, which he had been accustomed to wear immediately below the knee, and perhaps also to a long journey he had made on foot; that, lastly, the pulsating tumour had increased gradually to the size of the fist, however, without having been obliged on account of it to confine himself to bed. Dr MORIGI of Piacenza was the first who examined this patient attentively; and, as he was convinced that the singularity of the case would interest me very much, as in truth it did, he directed the patient to me at Pavia, with permission to retain him in the Practical School, if I chose to do so for the public advantage.

“ From the examination which I made, I was clearly of opinion that this tumour was an Aneurism. The difficulty turned upon determining, whether the pulsating bloody tumour proceeded from a wound of the popliteal artery, or of the posterior or anterior tibial arteries, or of the interosseous artery. I was inclined to believe, that it was formed by a rupture of the anterior tibial, and that the extravasated blood, by resting upon the anterior surface of the tibia, and compressing it, had excited the absorption and destruction of a portion of the body of that bone. After considering every thing in relation to the cure, and especially reflecting upon the loss produced in the tibia very near to the knee, I was of opinion that the amputation of the thigh, or the disarticulation of the leg at the knee, was to be preferred to any other operation. The patient refused to submit to it, and returned to his own home, in the district of Piacenza. The patient passed one year more in this state: he then had the misfortune to receive accidentally a blow on the tumour, and to fall several times upon the diseased knee, by which accidents pain was excited in

the tumor. Being incapable after some time of moving about any more, weak and emaciated, he resolved to return again to the hospital of Piacenza, imploring that operation which a year before he had refused to submit to. The celebrated MORIGI amputated the limb of the patient above the knee, and cured him. Immediately after, he injected the popliteal artery with wax, and sent me the pathological preparation, that I might examine it.

“ Having removed the integuments, I immediately proceeded to search for the great arterial trunks of the ham, and I was very much surprised to see, that the popliteal artery, as well as the two tibial and interosseous arteries, were in the most perfectly entire state. Afterwards, what principally fixed my attention was, the finding the aneurismal sac quite covered with arterial vessels, of a much greater size than that of the proper arteries of the cellular substance, and those of the periosteum.

“ On opening the Aneurismal sac, according to the length of the spine of the Tibia, I found it full of polypous layers after the manner of Aneurisms, and that the wax which had been injected by the popliteal artery, was mixed with these layers of blood. The parietes of the sac, on removing the polypous layers, were in some places six, in others four, in others three, lines in thickness. On examining attentively the substance composing these parietes, it was evidently that of the periosteum of the Tibia, thickened, fleshy, and covered by the compact subcutaneous cellular substance. The inner substance of this Aneurismal sac was villous, irregular, and similar, in some measure, to the placenta on the side which is attached to the Uterus. On introducing the fingers into the bottom of this sac, there were felt fragments of the body of the Tibia which had been corroded and absorbed ; and it was distinctly perceived, that the

lower portion of the body of the Tibia was no longer in continuity with the upper; while the thickened periosteum of the portion of the Tibia which was wanting, and which formed the sac, was in continuity with the periosteum of the rest of the Tibia, above and below the corrosion of it. The Fibula was untouched.

“ After cleaning thoroughly the inside of the Aneurismal sac, it was wonderful to see from how great a number of arterial orifices the wax injected into the popliteal artery soon after the amputation, had been effused into the cavity of the Aneurism. After the examination of these parts, I was of opinion, that the disease at first had only been a softening of a portion of the inside of the body of the Tibia, followed by an absorption of the substance of that bone from the inner towards the outer side, the periosteum covering it remaining entire, and in a state of perfect vitality : in the second place, that the greater than usual afflux of blood, and of the other humours to that part, had, as usually happens in the capsules of encysted tumours, thickened the periosteum, and greatly enlarged in diameter the proper arteries of this membrane. From the open extremities of these arteries of the periosteum, the arterial blood being poured in great quantity, and with great impetuosity into the cavity left by the portion of the Tibia which had been absorbed; this periosteum compressed and thickened, with the addition of the subcutaneous cellular substance, had been converted into a pulsating, or aneurismal sac.

“ The patient having enjoyed a very good state of health for five successive years after the amputation, in the winter of 1797 began, without any evident cause, to complain of a kind of pain in the extremity of the stump. Not long after it enlarged so much, that he could with difficulty apply the wooden leg to it, which he had hitherto worn easily.

MORIGI visited the patient, and besides the increased size of the stump, found what was still more extraordinary, that the stump itself was an aneurism, or at least that it pulsated after the manner of a large Aneurism. The patient left the hospital; but he was not lost sight of. Some months after, it was observed, that not only the stump, but likewise all the rest of the amputated thigh, nearly as far as the loins, was increased in size, and pulsated like an aneurism: and, farther, that on handling the remains of the thigh, a crepitation was felt deeply in it, as if fragments of broken bones; an unequivocal proof, that the bony substance had been softened, then absorbed, the soft parts covering the diseased parts remaining untouched. Towards the end of the summer 1798, this unhappy man, exhausted by a slow fever, came again into the hospital, and died a few days after. The femoral arterial vessels were immediately injected: and the preparation being separated from the pelvis, was sent to me, to be placed along with the first.

“On opening the tumour lengthwise, for so the remains of the amputated thigh might be called, I found it full of bloody polypous clots, similar to those which are found in the cavity of an aneurism. The substance of the *Os Femoris* had been absorbed through the whole space from the apex of the stump, to the vicinity of the great Trochanter, and the absorption was about to proceed likewise to the neck of the thigh-bone. The periosteum of all this portion of the thigh-bone, from the stump to the Trochanter, had remained untouched, thickened, interspersed with bloodvessels very much dilated, and converted into a sheath which supplied the place of an aneurismal sac*.”

Mr FREER of Birmingham inserts, in his work on Aneu-

* Both of these preparations are preserved in the Pathological Cabinet of the University of Pavia.

rism *, a description of two distinct cases of the same kind.

“ John Jones was admitted into the Birmingham Hospital with a considerable enlargement of the left fore-arm. Six weeks before his admission, it had been bruised by the fall of some gravel, which gave him very little pain at the time, and after a few days the effects of the injury seemed removed. But in the course of three weeks, the arm swelled, and he felt a beating and throbbing in it, attended with considerable pain, which led him to apply for assistance to one of those female empirics, well known in most towns by the mischief they inflict on the ignorant and the poor : the old woman considering it as an abscess proper to be opened, plunged a lancet into the tumour, and a very profuse bleeding ensued ; but immediately applying lint to the wound, and binding it up tightly, the hæmorrhage was restrained. In this state he continued some days, when the throbbing and pain returned, the wound opened, and the bleeding recurred every second or third day, till he was admitted under my care.

When I first saw him, the whole of the fore-arm was found considerably enlarged, without any discoloration, except where the puncture was made ; and a peculiar sensation was observable throughout the whole of the tumour, that gave me the idea of a deep-seated pulsation. The case was involved in much doubt : it was considered an aneurism of the interosseal artery ; and, accordingly, having secured the humeral artery by the tourniquet, an incision was made in the direction of the flexor muscles. A profuse hæmorrhage ensued, which was with difficulty restrained by screwing the tourniquet ; a large quantity of coagulum was found organized, and interspersed with bony concretions, contained in a variety of sacs formed between, and in the body of

* Observations on Aneurism, &c., pp. 25, 8. Birmingham 1807.

the muscles themselves, many of which could not be distinguished from the disease. Underneath this mass, the bones, both radius and ulna, were so much diseased, that amputation above the elbow was deemed the only remedy.

“ After removing the limb, the stump had a very florid but healthy appearance; the humeral artery, with five muscular branches, were taken up, and the stump dressed in the usual way; the cure went on favourably, and the patient was dismissed cured in three weeks.

“ Two months afterwards, the man applied again for relief, having had frequent bleeding from small orifices upon the side and fore part of the stump; these made their appearance in small black specks, bled profusely, but stopped of their own accord. He was again admitted into the Hospital, the stump was dressed with mild cerate, a gentle pressure was made by a roller, and the wounds soon healed. The roller was continued. In the course of a week he was seized with violent hemorrhage from the lungs, for which he took diluted sulphuric acid, and lived on a milk diet.

“ For three weeks he was apparently recovering, when the specks appeared again upon the stump, and, notwithstanding the pressure made by the roller, they gave way, and a violent bleeding suddenly ensued, which stopped of itself before any assistance could be afforded. He was much weakened by this hemorrhage, and his pulse remained very slow and feeble for some days. His health, however, began to recruit; but before he was recovered the hemoptoe returned: for this he was bled and digitalis given. From this time he had no return of hemorrhage while he remained in the Hospital, which was about five weeks; upon leaving it he went to the country, where he died consumptive in a few weeks. I was not informed of his death at the time, which prevented my making any examination of the body.

“ Minutely examining the amputated arm, a large quantity of coagulated blood was found in a variety of sacs formed in and among the muscles. This coagulum was organized, and numerous well injected vessels were perceived passing through it in all directions. The ulnar, radial, and interosseal arteries, with several of their branches, were all sound, but appeared much enlarged; their coats were covered with thick and strong layers of coagulable lymph. The radius and ulna were both carious, and nearly dissolved at their centre by the blood with which they were surrounded.

“ Richard Taylor, aged twelve years, of a thin delicate constitution, and weak scrofulous habit, about six weeks before Christmas, first perceived a swelling upon the outside of his right leg, beginning about an inch below the knee, and extending beyond the calf of the leg*. Its increase was gradual, elevating the external parts into one uniform tumour. It was attended with intense pain, but without any external discoloration. He did not recollect having received any injury near the part, though it is probable such an accident may have occurred.

“ In this stage, poultices and embrocations were used, though without any good effect. A caustic also was applied, but without advantage. Upon puncturing it with a lancet, a quantity of florid blood was discharged. The tumour increased daily, and when admitted into the Birmingham General Hospital in February 1806, it was in size equal to the head of a new born infant. Its origin upwards was from the head of the gastrocnemius, and extended below the belly of that muscle. It was firmly attached to the neighbouring solids. The limb preserved its natural colour, though the apex of the tumour was much inflamed, and its

* The author's description of this case is accompanied by drawings.

sides covered with varicose veins. The sensation remained entire in the lower part of the limb, and the pulse at the ankle was perfect. Sometimes the boy complained of pain in certain parts of the tumour, at other times it would be totally insensible. In the lower part fluctuation was imperfectly perceived, but the upper had a hard carcinomatous feel. The true nature of the disease was involved in much obscurity. A large poultice was applied, which rendered the parts softer, and the whole tumour appeared as if coming to suppuration, increasing much in size and pain.

“ About a fortnight had elapsed, when a small tubercle appeared on the centre of the tumour ; a few small pustules were often brought out by the poultice, which suppurated and discharged a quantity of thin matter, mixed with much blood. The hardness and pain increased with lividness, and seemed to indicate something scirrhus ; the patient’s habit of body led some to think it a mere scrofulous abscess, others thought it partly scrofulous and partly cancerous. The existence of Aneurism was probable ; but there was no evident pulsation, and the heat and sense of the limb remained as usual. The hardness to the touch rendered it probable that aneurism might be attended with considerable ossification, and this might preclude the characteristic symptoms of that disease. At any rate, it was a doubtful and a dangerous case, and the health of the patient daily declining, it seemed necessary that some investigation should decide its nature and the method of cure. It was proposed, therefore, that an incision should be made into the body of the tumour. The circulation in the femoral artery being previously secured by the tourniquet, on the 25th of March an incision was made ; and immediately a quantity of florid blood, mixed with much coagulum, was discharged. When examined by the finger through the orifice, extensive ossifi-

cations, with the total destructions of the head of the fibula, were distinctly perceived. Amputation, therefore, remained the only resource, and was accordingly performed.

“ On dissection of the amputated limb, the sac was found of an aponeurotic texture, derived from the periosteum both above and below ; the vessels of which still continued to pour out ossific matter, modelling it into innumerable honey-comb-like cells, lining the internal surface of the sac. The contents were a quantity of organized coagulum, connected to the sac by many fibres, or rather vessels, which were distributed very copiously into the mass of coagulum, depositing here and there an osseous matter, which in some places was accumulated to the size of a pea, in pieces of an angular shape, white, and of a substance completely bony and hard ; in others it was of a texture resembling cartilage, pliable, and not so hard. The fibula was entirely dissolved for the space of three inches, and the muscles seated on the outside of the leg were destroyed near the disease, so far, as to leave only part of their substance forming the walls of the sac.

“ The popliteal artery was sound, and at the usual place of bifurcation divided into the tibialis posticus and anticus ; the anticus went through the leg upon the posterior part of the sac, without any interruption in its course, and without sending any branch into the tumour. Having arrived at the fore part of the leg, it gave off its branches in the usual manner, and continued sound all through the foot. The posterior tibial artery was completely sound, and having gone round close to the body of the sac, gave off the fibular artery, which was natural in its course and uninterrupted. The tibial artery also went off in the usual manner, nor from any of the arteries could a branch be discovered which furnished the disease.”

PELLETAN*, among a large collection of tumours which he describes as analogous to Aneurism, includes the three following; which I think may be justly regarded as belonging to that peculiar species of Aneurism under consideration in this Essay.

“ A l'ouverture du corps d'un homme qui mourut d'une maladie de poitrine, j'aperçus au côté interne de la cuisse, et postérieurement vers son tiers supérieur, une tumeur du volume du poing. Elle n'avait causé aucune altération à la peau. Les élèves présens témoignèrent qu'ils n'avaient eu aucune connaissance de cette tumeur pendant la vie du malade. Je ne puis dire par conséquent si elle avait été ou non accompagnée de pulsations; nous en fîmes l'ouverture: elle contenait une masse de sang en caillots peu solides et en partie séparée de sa partie séreuse. Le tissu cellulaire environnant lui fournissait une espèce de kiste assez mince et borné par le corps du fémur, dont le périoste était sain. On y voyait l'artère nourricière de cet os corrodée et comme entr'ouverte au point où elle allait entrer dans le canal que le fémur lui fournissait. J'ai cru apercevoir que l'entrée de ce canal osseux était raboteuse et inégale.

“ Joseph Fleuraut, âgé d'environ vingt-cinq ans, se présenta à l'Hôtel-Dieu dans le courant de l'année 1806, pour une tumeur qu'il portait à la circonférence du haut de la cuisse de côté gauche. Cette tumeur ne changeait point la couleur de la peau; elle offrait généralement une mollesse égale, et même une espèce de fluctuation; l'on n'y découvrait pas la plus légère apparence de pulsation; elle ne causait aucune douleur au malade; enfin, il serait difficile d'exprimer son volume, à cause de la largeur que lui donnait la circonférence de la cuisse et de son élévation dans

* Clin. Chirurg. Tom. ii. pp. 37, 38, and 41.—Obs. iv. v. and vi.

différentes parties de lieu qu'elle occupait. Je regardai cette tumeur comme tenant au scrofule, ou comme ce qu'on appelle un dépôt par eongestion, d'autant plus qu'elle s'était développée à ce point dans l'espace d'environ dix-huit mois.

“ J'ordonnai l'application d'un grand emplâtre de diachilon gommé et quelques remèdes internes analogues, à l'idée que j'avais d'un vice serofuleux. L'appliation emplastique fut continuée et renouvelée pendant un mois, et je croyais m'apercevoir, chaque fois que j'y regardais, que la tumeur prenait du volume et une apparence plus grande de fluctuation, quoique la douleur ne s'accrût pas. Je me persuadai alors qu'il était indiqué d'y pratiquer une ouverture, et que la tumeur était assez échauffée pour pouvoir fournir une bonne suppuration. Afin de rendre encore cette propriété plus énergique, j'appliquai une traînée de pierre à cautère sur le côté externe de la tumeur, au lieu qui était le plus saillant et déclive. L'incision de l'escarre donna issue à une prodigieuse quantité de concrétion lymphatique albumineuse ou fibrille, de couleur jaunâtre, et telle que se présente le coagulum du sang privé de sa partie colorante. La compression de la tumeur dans les différens points de son étendue exprimait, et portait au-dehors, chaque jour, une nouvelle quantité de cette conerétion. Cependant elle fut bientôt accompagnée d'une suppuration sanieuse; la peau devint bleuâtre, et la partie malade très-douloureuse. La pourriture s'empara de différentes régions de la cuisse, et le malade mourut le dixième jour de l'ouverture de foyer.

“ A l'examen du cadavre, je trouvai que le tissu cellulaire renfermait encore une grande quantité de la même substance, qu'elle était répandue indistinctement dans les grands intervalles qui séparent les museles de cette région; enfin, à la partie postérieure semblait être un foyer particu-

lier qui avait beaucoup contenu de cette matière, et où répondait l'artère nourricière de l'os fémur corrodée, dilatée et irrégulièrement entr'ouverte.

“ Marie Charles, âgé de vingt-trois ans, entra à l'Hôtel Dieu, le 26 Février 1810, pour une tumeur qu'il portait à la partie supérieure externe de la jambe du côté droit, au-dessous du genou, et dans l'étendue du tiers supérieur du muscle jambier antérieur. Cette tumeur, dont la base était fort large, semblait occuper le condyle externe du tibia, s'élevait du volume d'un gros euf de poule d'Inde : il y avait six mois qu'elle s'était annoncée, sans que le malade n'ait pu lui assigner aucune cause. Charles était au troisième mois du développement de sa maladie lorsqu'un chirurgien lui conseilla de garder le lit ; et, quoiqu'il regardât la tumeur comme un dépôt froid, il prescrivit des cataplasmes émolliens, et se disposa à en faire l'ouverture. Croyant cet abcès assez mûr, il y plongea un bistouri ; mais, au lieu de pus, il ne donna issue qu'à du sang.

“ La tumeur, qui n'avait que très peu diminuée par l'évacuation sanguine, s'accrut avec plus de promptitude : ce fut dans cet état que le malade se présenta à l'Hôtel Dieu. La tumeur avait assez de mollesse pour que la fluctuation fût évidente. Elle ne présentait nulle apparence de pulsation artérielle ; elle ne changeait point la couleur de la peau, qui était seulement bleuâtre à l'endroit de la petite cicatrice de la plaie qui avait été faite trois mois auparavant.

“ J'incisai la tumeur de haut en bas, dans toute la longueur de son diamètre, et à une grande profondeur. Je rencontrai une épaisseur de sang en caillots d'une solidité médiocre. Ces premiers caillots extraits, il s'en présenta qui étaient plus solides, de couleur jaunâtre et disposés par couche, comme dans les anéurismes ordinaires. La quantité

totale était considérable, et remplissait une vaste cavité prise aux dépens du condyle externe de tibia, qui était corrodé dans toute son épaisseur, et réduit à la surface cartilagineuse servant à l'articulation. Cependant l'articulation elle-même n'était point endommagée, et le malade n'y avait senti ni douleur ni embarras dans les mouvemens.

“ Le sang pénétrait aussi dans le tissu cellulaire, le long de la face externe du ligament interosseux : l'espèce de coque formée par les caillots solides empêchait l'infiltration dans toute autre direction. Lorsque j'eus à peu près nettoyé cette espèce de caverne, je vis sourdre du sang vermeil de sa partie voisine du commencement du ligament interosseux ; mais ce sang coulait en nappe, malgré que j'eusse fait lâcher le garrot : il n'y avait pas l'apparence de pulsation et jamais l'expression de sourdre n'a eu une plus juste application. N'apercevant aucune indication de vaisseau à lier, ne pouvant même espérer de me rendre maître de toute hémorragie par une compression méthodique, je l'ai amputé sans délai.

“ A l'examen de membre amputé nous trouvâmes encore, dans le fond de la poche de l'anéurisme, beaucoup de caillots de sang résistans et très-serrés. On vit la corrosion de toute l'étendue du condyle externe du tibia. La partie supérieure du ligament interosseux était enfoncée comme pour augmenter l'étendue de la cavité générale. L'artère tibiale antérieure était intacte : nous trouvâmes également dans l'état d'intégrité le tronc de la poplitée, ses branches articulaires, la tibiale postérieure et la péronienne. J'ai fait dessiner les parties avec autant d'exactitude qu'il a été possible.—Voyez fig. 1. pl. I. v. 3.”

HODGSON *, under the head of “ Anomalous Tumours,

* On the Diseases of Arteries and Veins. 8vo. Lond. 1815, pp. 449, and 451.

arising from Diseased Arteries," relates two cases of disease, appearing to arise, he says, "from rupture of some of the smaller arteries which opened into the tumour."

"A large tumour occupied the whole circumference of the lower part of the thigh of a man about fifty-five years of age. This swelling had existed nearly six months. It commenced a few inches above the inner condyle of the femur. At first it was moveable, but, as it increased, it gradually became more attached to the bone. Its growth was attended with violent pain. The skin was not discoloured, nor the veins enlarged. It was elastic, but not very compressible; no pulsation could be discovered in it. The knee possessed the power of motion, and the pulse at the ankle was natural. An incision was made into the tumour, to ascertain the nature of its contents. A quantity of fluid blood rushed out, and was followed by clots of coagulum. When the clots were sponged out, a copious hemorrhage took place from the surface of the sac. The thigh-bone was found to be denuded throughout its whole circumference, and so much diseased that the amputation of the limb was deemed necessary. The stump appeared to do well for some days, when its surface began to slough, and the patient died in a fortnight.

"The amputated limb was injected and dissected, but no large vessel could be discovered communicating with the sac. The popliteal artery pursued its usual course, passing over the posterior part of the sac. Extensive depositions of calcareous matter had taken place in all the arteries of the limb. The femoral vein was healthy. The sac appeared to be formed of the surrounding muscles and fascia, and was divided by numerous septa, in some of which patches of bony matter had been deposited. It contained partly fluid and partly coagulated blood, which, in

places, had a membranous appearance. A quantity of injection was extravasated into the sac, but we could not discover any large vessel from which it had issued. The mouths of many minute arteries were seen upon its surface, through which the injection had been discharged into the sac."

"A woman, 30 years of age, had, for several months, suffered severe pain and fever, which attended the growth of a tumour at the lower part of the thigh. The swelling had the same appearance as that described in the last case: it was situated in the same part of the limb, but was not so large. Its origin was imputed to violent extension of the muscles of the thigh. The limb was amputated, but the patient, who was extremely reduced by her previous sufferings, died in the course of a few weeks. The principal arteries and veins in the amputated limb were carefully dissected. They were in their natural state; not the slightest disease or rupture could be discovered in them. The sac was of a thin membranous structure, and divided into numerous cells, which contained blood in different stages of coagulation. Calcareous matter was deposited in some parts of the sac. The thigh-bone was carious."

Mr LISTON* relates an extremely well-marked case of Osteo-Aneurism, under the title of "Ossified Aneurismal Tumour of the Subscapular Artery."

"Robert Macnair, æt. 16, applied to me on the 15th November 1819, on account of a tumour over the left scapula. On examination, I found the tumour very large, rendering him, as it were, hunch-backed, hard and inelastic, firmly fixed to the left scapula, and extending from the spine over all its lower surface. It stretched into the axilla

* Medical and Surgical Journal, vol. xvi. pp. 66, 215, with an Engraving.

likewise, to within half an inch of the nerves and vessels, and a large branch, the subscapular, could be felt creeping along its under surface. The arm hung by his side quite useless, and, from the wasting of the muscles, not more than half the size of the other. The uneasiness produced by the tumour was trifling, according to his account, when compared with the shooting and excruciating pains of the extremity. I was led to imagine that some bony spiculæ extended into the substance of the swelling, from feeling, in my attempts to move it independently of the scapula, a good deal of crepitation, as if pieces giving way.

“ The disease was first perceived three months ago, immediately below the spine of the bone, about the size of a filbert, but of a flatter form, and had of late increased rapidly. About ten days before he applied to me, it had been punctured by a surgeon in Kinross, when nothing but blood escaped. It was evident from the rapid growth, and other circumstances attending the case, that the boy would soon be destroyed, unless an operation were attempted. On considering the case, and examining it in all its relations, it appeared, 1st, By the freedom of respiration, that the ribs and intercostal muscles, of course the vital organs in the thorax, were sound; 2dly, That, though the tumour was firmly fixed to the scapula, yet that the bone was equally moveable as the one on the opposite side; and as the vessels and nerves in the axilla were wholly unconnected with the disease, I immediately made up my mind to remove it, and, if it could not be avoided, to sacrifice the greater part of the scapula also.

“ Next day, accordingly, I proceeded to the operation. I began by making an incision of a foot long at least, from the axilla to the lower part of the tumour. The latissimus dorsi was then cut across, at about two inches from its in-

section, so as to expose the inner edge of the swelling, with a view to tie the subscapular in the first instance. In this I was foiled, owing to its depth, as it passed under the lower edge of the tumour, out of reach of my fingers. I then proceeded to dissect where I expected vessels to enter from the supra-scapular. With this view, in detaching it from the spine of the scapula, I felt my finger and knife dip into the body of the tumour. This was attended with a profuse gush of coagula and florid blood. I immediately thrust my sponge into the cavity, so as nearly to command the hemorrhagy. One of my assistants, at the same time, tried to compress the subclavian, but to no purpose, as the shoulder and arm were much raised, to facilitate the dissection in the axilla, which circumstance increased the difficulty of commanding the vessel on the left side. The patient, who had borne the operation well, exhausted by this, and the loss of blood from the large vessels supplying the tumour, divided in the former incisions, after some efforts to vomit, now dropped his head off the pillow, pale, cold, and almost lifeless. I then only became aware of the nature of the case, and saw that nothing but a bold stroke of the knife could save the boy from immediate death. Pulling out the sponge, therefore, with one rapid incision I completely separated the upper edge of the tumour, so as to expose its cavity; and, directed by the warm gush of blood, immediately secured with my finger a large vessel at the upper corner, which, with open mouth, was pouring its contents into the sac. With my right hand, I then cleared away the coagula, and dissecting under my finger, separated the great subscapular artery, so that one of my assistants could pass an aneurism needle under it, at its origin from the axillary, and about an inch from the sac. After tying this, and two other large

vessels which supplied the sac, I dissected off the tumour from the ribs, without further hemorrhagy, cutting with my knife the carious scapula and under part of the sac. After removing the tumour, I found it necessary to saw off the ragged and spongy part of the scapula, so as to leave only about a fourth part of that bone, containing the glenoid cavity, processes, and half of the spine.

“ 26th.—The wound is now completely filled up by healthy granulations, and contracting rapidly; discharge by no means profuse, nor has it been so; appetite good; pulse 80, and soft; all the functions natural. On the 23d he was so well as to be out of bed.

“ Dec. 27.—The sore has put on rather an unhealthy appearance, and at the upper part of the wound, about an inch from the place where the subscapular artery had been tied, there has arisen a fungous excrescence, of a dark purplish colour. 28th.—He awoke this morning drenched in blood, but the hemorrhagy did not last long; and from examining the bed-clothes, it would appear he may have lost from lb. i. to lb. iss. On removing the dressings, the bleeding was found to have arisen from the fungus, which had increased in the course of twenty-four hours from the size of a pea to that of a cherry.

“ Jan. 1. 1820.—Since last report there has been a slight oozing of blood. The fungus has attained the size of a walnut, and appears increasing, and there seems to be a slight swelling above the wound. The portion of scapula that has been left is more prominent than the corresponding one on the opposite side, and seems as if it were raised by some growth below it. The fungus excrescence seems to be attached to, or rather projecting from under the cut edge of the scapula. He has little or no pain in the part; and the arm which was so much wasted before the opera-

tion, has acquired the size of the other, but he has not recovered much more power in it. 2d.—The projecting tumour, however, had attained the size of an apple, and by the sides of it, on pressure, a quantity of bloody serum issued. The rest of the sore was completely cicatrized. This day the bleeding returned more violently than ever. On hastening to his assistance, we found his clothes wet with arterial blood, and on removing them, with the bandages, &c. quickly, perceived that it flowed from the sides of the dark-coloured tumour. This mass being merely coagulum, I twisted off the projecting part, and with my fingers cleaned the cavity down to the bone. I then dilated the opening in the integuments with a probe-pointed bistoury, so as to assure myself, by actual inspection of the bone, that the blood proceeded from its substance. By the application of dossils of lint it was easily commanded.

“ During the three following weeks the hemorrhagy was completely restrained, by opening the fungi while small, and stuffing the cavity to the bone (to which they uniformly led) with the solution of Nitrate of Mercury. The wound, however, became filled with loose spongy granulations, and, apparently from the enlargement and disease of the glenoid cavity, the head of the humerus was dislocated forwards. I proposed the removal of the remaining portion of the scapula and arm, with half of the clavicle, and represented the ease with which the subclavian might be tied by turning forward the scapula from the ribs, and that in this way the boy would lose but little blood. As I could get no one to second me in my opinion, I was very unwillingly obliged to give up all thoughts of operating, and sent the boy home. I was induced to do so the more, that at this time a severe cough and expectoration came on, with symptoms of hectic. Feb. 28.—Up to this period I learned

that there had been no hemorrhagy from the wound, further than a slight oozing once or twice: the sore, however, had spread considerably, especially towards the axilla, and there seems now to be an immense collection of coagula, which are retained in the wound only by a thin layer of coagulable lymph. He is much emaciated, and his appetite is falling off considerably.

“ The tumour, though possessing some of the characteristics of Aneurism, is quite unique in many points. The sac is composed of bony matter, containing little earth, and arranged in strata of short fibres pointing to the cavity. Its outer surface is smooth, and covered by a very dense membrane, whereas the inner, to which so equable a resistance was not afforded, is studded with projecting spiculæ. The lower part of the scapula lies in the middle of the sac, partly absorbed and covered by coagula, and the remains of the muscles. Very large vessels are perceived running on the surface of the tumour. For a more minute account, I must refer to the explanation of the engraving, which is a faithful representation of the diseased mass removed.

“ I am not aware that any account of this disease has been given.”

Professor LALLEMAND of Montpellier*, affords us a very distinct example of the same disease.

“ M. Firman de Hoyos, d'un caractère vif et décidé, d'une constitution sèche et robuste, marin, a quarante-trois ans, douleurs vagues dans différentes articulations, douleur plus vive fixée subitement sur le genou droit. application de quatre sangsues, guérison en douze jours. Pendant un an rien de remarquable; à cette époque retour subit de la douleur au genou droit. Application de cinquante sang-

* Répertoire Générale, &c. Tom. ii. p. 137.—Observations sur une tumeur Anéurismale accompagnée de circonstances insolites.

sues en quatre fois, cataplasme de graines de lin, fumigations émollientes et narcotiques autour du genou, point de soulagement. Au bout de trois mois, application successive de six vésicatoires autour de genou, exaspération notable des douleurs; le malade, excellent observateur, sent des pulsations au-dessous de l'articulation, mais ses médecins refusent d'y croire, et regardent la maladie comme une affection rhumatismale ou goutteuse; plus tard d'autres médecins soupçonnant une cause syphilitique appliquent sur le genou des cataplasmes unis au mercure; augmentation rapide des douleurs et du volume du genou. Enfin au bout de trois mois, les médecins ne peuvent plus nier l'existence des pulsations, mais ils ne sont pas d'accord sur leur cause ni sur le moyen curatif à employer; et le malade après sept mois de traitement se décide à venir à Montpellier (Mars 1826). Quoi-qu'il fût bien décidé à se faire opérer, il consulta en passant à Toulouse un chirurgien d'une réputation justement méritée, il en reçut la consultation suivante: ' Tout sembler indiquer l'existence de deux tumeurs anéurismales; cependant il m'est difficile de décider si le battement de ces tumeurs dépend réellement de la dilatation des parois des deux artères articulaires inférieures, ou si elle tient à l'existence d'un fungus hématodès ou à une maladie de l'articulation du genou.'

“ Voici dans quel état je trouvai le malade: Quarante-cinq ans, facies en indiquant au moins soixante, pâleur extrême tirant sur le jaune, rides nombreuses et prononcées annonçant l'habitude de la douleur, membre abdominal droit comme atrophié, surtout au-dessus de la rotule, genou droit un tiers plus gros que le gauche, environné de nombreuses veines variqueuses et recouvert d'une peau tendue et rosée, jambe fléchie sur la cuisse, mouvemens volontaires presque nuls, mouvemens communiqués très douloureux, ex-

tension complète impossible, tête du péroné très saillante, douleur excessive partant de son côté externe et suivant le trajet du nerf péronier. Quand le malade retenait sa respiration les veines variqueuses qui entouraient le genou doubleraient de volume, et la peau prenait une teinte rouge violacée; le même phénomène se manifestait dès que la jambe était pendante; quand au contraire le pied était très élevé la peau reprenait sa couleur naturelle et les veines disparaissent complètement. L'extrémité supérieure du tibia avait à peu près double du volume. Au côté interne du tendon de la rotule était une tumeur oblongue aplatie, de la forme et du volume de la moitié d'un œuf de dinde; la main appliquée à plat sur cette tumeur sentait distinctement des battemens très étendus, isochrones à ceux du cœur et accompagnés d'un mouvement d'expansion dans tous les sens; au côté externe de la rotule au devant de la tête du péroné existait une seconde tumeur saillante sous la peau, à peu près de la forme et du volume de la moitié d'une noix, offrant les mêmes battemens que la précédente: on les faisait cesser complètement dans l'une et dans l'autre en suspendant la circulation dans l'artère crurale. Lorsqu'on levait les doigts le malade sentait un feu qui parcourait rapidement l'artère comme un charbon et allait dans le genou: c'était au sang qu'il attribuait cette sensation, il prétendait pouvoir en suivre la marche quand il rentrait dans l'artère. Ce premier aperçu et l'opinion émise dans plusieurs consultations me firent croire d'abord que les deux artères articulaires inférieures étaient en effet le siège de l'anéurisme. Mais, guidé dans mes recherches par le malade lui-même, qui s'était observé avec une grande sagacité, je ne tardai pas à constater que le ligament de la rotule droit était plus saillant et beaucoup plus large que celui du côté opposé.

“ Au côté interne se trouvait une petite élévation qui dé-

passait le niveau du reste de la tumeur, elle n'avait paru que depuis deux ou trois mois ; en cet endroit on sentait les pulsations beaucoup plus distinctement ; en comprimant perpendiculairement cette petite élévation avec le doigt indicateur, on enfonçait dans la tumeur principale presque toute la première phalange, et l'on sentait une ouverture circulaire de cinq à six lignes de diamètre dont la circonférence était dure et mince ; en appuyant fortement le pouce sur le bord de cette ouverture on sentait la tumeur céder avec un bruit exactement semblable à celui qu'aurait produit une coque d'œuf qu'on aurait cassée en la comprimant. La petite tumeur située au côté externe, pressée de la même manière, s'aplatissait peu à peu en faisant entendre de temps en temps un bruit semblable ; enfin, en comprimant l'une des tumeurs, on rendait l'autre plus saillante et les battemens devenaient plus superficiels.

“ Dès lors il me parut évident que la tumeur anéurismale s'était développée dans l'intérieur même de l'os, qu'elle l'avait dilaté et aminci, que le tendon de la rotule soulevé et aplati par elle, mais opposant une plus grande résistance à la destruction que le tissu osseux, l'avait forcé à se partager pour ainsi dire en deux et à faire saillie de chaque côté.

“ La maladie bien reconnue, la ligature de l'artère crurale devait se présenter naturellement à la pensée comme le seul moyen qui pût offrir quelque chance de guérison en conservant le membre. Le 4 avril en présence des praticiens consultés, MM. DUBREUIL, DUGES, et DUNAL, j'exécutai l'opération projetée ; l'artère complètement isolée vers le tiers supérieur de la cuisse, et soulevée par le fil, nous parut avoir des parois d'une épaisseur peu ordinaire ; jusque là le malade m'avait tranquillement regardé opérer et m'avait même adressé diverses questions, mais quand je ser-

rai la ligature il poussa un cri perçant, et dit ressentir une douleur brûlante dans la direction de l'artère : comme j'étais certain de n'avoir pas compris de nerf dans la ligature, je serrai le second nœud sans m'en inquiéter : l'un des fils de la ligature fut coupé près du nœud et la plaie fut réunie par première intention : les tumeurs s'étaient affaissées, les battemens avaient cessé, l'on pouvait introduire plus facilement le doigt dans l'ouverture de l'os. Au bout de deux mois, le malade se leva, mais quand le membre était pendant, le genou se gonflait et devenait rouge, la pression exercée sur la tête du péroné déterminait encore une douleur assez vive dans la direction du nerf péronien. L'application de la glace fit disparaître ces dernières symptômes : au bout de trois mois le malade appuyait sur sa jambe et pouvait marcher sans béguilles ; il partit peu de temps après pour Bagnères, où les douches accélérèrent sa guérison."

In the practice of M. DUPUYTREN in the Hôtel Dieu, three examples have occurred of Osteo-Aneurism. Their importance will, I hope, sufficiently justify me in extracting the details of these cases, as presented to us by M. BRESCHET in his valuable Memoir, *, somewhat fully.

"Clément-Nicolas Renard, âgé de trente-neuf ans : à trente-deux ans une tumeur se développa à la partie interne et supérieure du tibia droit au dessous de l'articulation du genou ; lorsqu'on appliquait la main sur cette tumeur, on y sentait des battemens isochrones à ceux du poulx. Elle augmenta considérablement de volume, et le malade entra à l'Hôtel-Dieu le 9 Février 1819. Il y avait un an que ce malade s'était aperçu pour la première fois que la jambe droite perdait sa force, et que souvent elle fléchissait ; qu'une petite grosseur s'était développée au-des-

* Op. jam cit. pp. 151-6-9.

sous du genou, et qu'il y éprouvait des élancemens. Il consulta un medecin qui lui fit appliquer des cataplasmes émolliens. A ce premier moyen on ajouta l'application d'un assez grand nombre de sangsues, enfin celle d'un vésicatoire. Ce traitement ne lui procura aucun soulagement, la tumeur pris de l'accroissement et la peau qui la recouvrait devint rouge. A son entrée à l'hôpital il était dans l'état suivant.

“ La tumeur occupe la partie supérieure externe et un peu antérieure de la jambe ; située à la partie supérieure de la face externe du tibia, elle s'étend vers son côté interne ; sa largeur est un peu moindre que celle de la paume de la main ; celle tumeur n'est pas circonscrite ; la peau qui la revêt est rouge et amincie ; elle offre dans presque tous les points des battemens isochrones a ceux du cœur, qui cessent lorsqu' on comprime l'artère crurale, pour reparaître aussitôt que la compression est suspendue. Les pulsations de l'artère pédieuse sont très distinctes.

“ On commence par appliquer sur la tumeur des compresses imbibées d'eau de Goulard ; on met sur la trajet de l'artère fémorale le cercle compresseur, mais le vaisseau glisse sous la pelotte, de manière que la compression ne peut produire son effet. Ce traitement mis en usage jusqu' au 10 Mars : n'ayant amené aucune diminution dans la tumeur, M. DUPUYTREN le 16 Mars lié l'artère fémorale. Pour s'assurer que l'artère est bien comprise dans l'anse de la ligature, M. DUPUYTREN tire sur les deux extrémités du fil, ce qui fait constamment cesser les battemens dans la tumeur. La ligature est serrée et ne cause presque pas de douleur. Le lendemain, la tumeur n'offrit plus de battemens ; elle s'affaissa et le membre jouit de toute sa sensibilité et de toute sa mobilité. Le sixième jour, on ne sentit plus de pulsations dans la tumeur ; du reste, le malade était

aussi bien que possible. Le quatorzième jour, dans la nuit, léger suintement sanguinolent.

“ La ligature tomba le quinzième jour, sans douleur, sans écoulement du sang. Le lendemain M. DUPUYTREN sentit de légers battemens dans la tumeur, et dans la nuit il y eut une hémorrhagie de deux poëlettes de sang, qui fût arrêtée au moyen du cercle compresseur, placé par le malade lui-même au-dessus de la plaie et sur le trajet de l'artère crurale. Il le retira malgré les défenses les plus expresses et les plus réitérées, et le vingt-deuxième jour une nouvelle hémorrhagie eut lieu; le malade, plein de courage et de sang froid, l'arrêta encore lui-même. A dater de ce moment jusqu' à sa sortie de l'Hôtel-Dieu, le 30 Avril, on maintint en place le cercle compresseur. Le lieu où la tumeur pulsative avait existé offrait encore un peu de tuméfaction, mais nul indice de battement, l'anéurisme avait disparu, l'engorgement seul persistait. Long-temps après cette opération, la tumeur reprit successivement un volume considerable.

“ Le 1er Août 1826, le malade s'entre de nouveau à l'hôpital. Il existait alors à la partie supérieure de la jambe droite vers l'articulation du genou une tumeur qui s'étendait depuis la réunion du corps du fémur avec les condyles jusqu' à celle du tiers supérieure avec le tiers moyen de la jambe; cette tumeur était beaucoup plus volumineuse en avant qu'en arrière; des veines qui rampient sous la peau étaient très dilatées, la peau était fine et menaçait de se rompre dans plusieurs points; on ne sentait aucun battement, la tumeur avait trente-deux pouces de circonférence; les mouvemens de flexion du genou étaient impossibles. L'état général était bon, quoique le malade fût maigre, pâle, et même d'une teinte légèrement jaune. Le 5 Août, M. DUPUYTREN pratiqua l'amputation, c'était la seule chance de

guérison que l'on pouvait avoir. Le 28 Août, vingt quatrième jour après l'opération, toutes les ligatures sont tombées, la plaie a un très bon aspect, elle est presque complètement cicatrisée ; le malade veut sortir de l'hôpital, M. DUPUYTREN lui accorde de retourner dans son pays.

‘ Le membre malade a été examiné avec soin par M. BRESCHET, qui, après l'avoir fait modeler en cire par M. DUPONT, a déposé ce modèle dans le Muséum d'Anatomie de la Faculté de Médecine. Le membre amputé présente un volume énorme, formé par le développement extraordinaire de l'extrémité supérieure du tibia. La rotule cachée dans l'épaisseur des tissus engorgés, et endurcis, ne paraît pas avoir augmenté de volume ; au-dessous d'elle immédiatement, commence la tumeur qui offre en avant, dans sa partie la plus saillante, un ou deux points ramollis, où le tissu osseux, qui paraît former sa coque, laissait sentir des pulsations produites sans doute par des vaisseaux très développés ou par l'ébranlement qu'ils imprimaient à la masse de la tumeur. La jambe, dans ses deux tiers inférieures, est saine, quoique le tissu graisseux paraisse plus abondant qu'à l'ordinaire ; la partie du membre abdominal située au-dessus de la rotule est dans le même état ; les points saillants et ramollis dont nous avons parlé sont après la séparation du membre affaissées, flasques, et offrent manifestement de la fluctuation. L'artère poplitée a son volume ordinaire ; mais elle offre de fréquents points d'ossification. Arrivée immédiatement derrière l'articulation fémoro-tibiale, elle est aplatie par la saillie très forte du ligament postérieur. Les artères articulaires ne sont pas plus développées qu'à l'ordinaire, elles paraissent très petites, quoique l'injection ait été poussée dans ces vaisseaux avec soin ; on observe que les branches qui pénètrent par la partie postérieure sont surtout très petites, entre autres les articulaires supérieure et

moyenne. La récurrente tibial antérieure est au contraire très volumineuse, ainsi que tout le système artériel correspondant à la partie supérieure du tibia qui est très développé, et l'on aperçoit de nombreuses branches se diriger vers cet os et en pénétrer la substance. Plus bas les artères reprennent leur état normal et n'offrent plus rien de remarquable. Le système veineux du membre malade s'est extrêmement accru ; les veines profondes sont doublées en volume, la saphène interne égale le volume du petit doigt très flexueuse, elle n'offre cependant pas ces nodosités qu'on observe dans les veines variqueuses.

“ L'extrémité inférieure de fémur présente son volume ordinaire ; mais son tissu est très ramolli, et il se coupe facilement avec le scalpel. La section faite perpendiculairement à l'axe de la jambe fait voir le tissu de cet os et de la rotule dans un état très avancé de ramollissement graisseux, mais toujours sans augmentation de volume. Le tibia, le seul os malade, est énormément développé, et comme soufflé dans la partie de son étendue qui forme les condyles. Scié perpendiculairement dans sa ligne médiane d'avant en arrière, il offre alors l'intérieur de la tumeur. Elle est divisée par compartimens et par loges, comme les fruits nommés grenades ; la loge antérieure la plus grande, est remplie d'une matière semblable à la gélatine ; les parois de la cavité sont tapissées d'un réseau vasculaire très développé. D'autres loges contiennent la même matière ; d'autres une substance jaunâtre, noirâtre en d'autres points. Sur la membrane qui tapisse quelques-unes de ces loges, on voit des réseaux vasculaires distendus par l'injection poussée dans les artères. Cette même injection s'est épanchée dans quelques autres de ces lacunes ou larges cellules. Enfin, quelques-unes d'entre elles sont remplies de couches albumineuses formées par du sang coagulé, comme on en voit dans

les tumeurs anéurismales anciennes. Les cartilages, presque intacts, sont seulement décollés des surfaces osseuses et mobiles au milieu du désordre.”

“ Jean Thévenin, âgé de vingt-deux ans, d’une constitution faible, n’ayant jamais eu d’autre maladie que de la gourme dans son enfance, éprouva, en faisant un effort pour éviter de tomber, au mois de Décembre 1824, un craquement dans le genou droit ; depuis cette époque il éprouva de loin en loin des douleurs aux-quelles il fit peu d’attention. Au mois de Septembre 1825 il fit un nouvel effort pour éviter une chute, et aussitôt le genou droit se tuméfia considérablement ; on appliqua quarante sangsues, le gonflement devint de plus en plus grand et les douleurs étaient très aguës. Alors le malade employa plusieurs moyens, et mit successivement en usage la graisse, l’électricité, un séton, et le tout sans succès. La maladie augmenta bientôt et le malade ne put plus marcher. Il entra à l’Hôtel-Dieu au mois de Mars 1826 ; il était dans l’état suivant : une tumeur existait à la partie externe de l’articulation fémoro-tibiale droit, ayant presque le volume du poing, sans changement de couleur à la peau, offrant des battemens isochrones aux pulsations des artères ; ces battemens cessaient par la compression de l’artère poplitée ; la jambe était en demi-flexion sur la cuisse, et les mouvemens d’extension ou de flexion étaient très douloureux.

“ M. DUPUYTREN ayant examiné le malade, prononça qu’il était affecté d’une tumeur sanguine à l’extrémité supérieure du tibia avec dégénérescence des tissus, ce qui le porta à renoncer à toute idée de ligature de l’artère fémorale et à préférer l’amputation de la cuisse. Le malade se refusa à l’opération et retourna chez lui ; il y resta un mois ; pendant ce temps on entretint le séton, la maladie ne fit qu’aller en augmentant. Un médecin pratiqua une in-

cision dans la tumeur, il s'en écoula du sang. Enfin le malade rentra à l'hôpital le 3 Mai ; il était alors décidé à se laisser opérer ; mais comme il redoutait beaucoup toute espèce d'opération, il s'était monté l'imagination pour paraître ne rien craindre, et il affectait un courage qu'il n'avait pas. D'ailleurs la tumeur offrait les mêmes caractères qu'à la première entrée du malade dans l'hôpital, elle avait seulement plus de volume et ses battemens étaient plus obscurs. Le Mai 5, M. DUPUYTREN pratiqua l'amputation de la cuisse. La hémorragie arrivait deux jours après, des symptômes survinrent, et le malade succomba le 9 Mai.

“ A l'examen du moignon, l'os est dénudé dans l'étendue de quatre lignes, toutes les ligateurs persistent. A l'examen du membre, la tumeur était moins volumineuse qu'avant l'opération, elle était surtout affaisée dans le point qui avait été le plus saillant ; en la comprimant on sentait qu'elle résistait sous le doigt dans des points beaucoup plus que dans d'autres, et en augmentant la pression elle cédait en faisant entendre un petit bruit. L'artère poplitée et ses divisions à la partie supérieure de la jambe n'offraient aucune altération, si ce n'est que le calibre de ces vaisseaux était supérieur à ce qu'il aurait dû être. La section de la tumeur ne permettant pas de faire une injection régulière, c'est-à-dire avec une substance solidifiable et colorée, on se contenta de pousser de l'eau par l'artère poplitée ; ce liquide arriva dans le tissu de la tumeur et y parut par une multitude d'orifices. Il ne s'en écoula point à l'extérieur, ce qui démontra que le système artériel de la jambe était sain, hors du tissu osseux affecté.

“ L'examen attentif de tissu même de la tumeur permit de reconnaître qu'elle était remplie par du sang dans le lieu même où aurait dû exister le tissu cellulaire ; que ce sang

était par couches concentriques, qui ne formaient pas les parois d'un foyer unique, mais un assez grand nombre de loges, comparables pour leur apparence à celles d'un favus ou rayon de miel, d'une dimension plus grande. Les couches extérieures étaient moins colorées, plus denses que celles du centre qui avaient la couleur et la consistance d'un simple caillot. De l'eau pure injectée dans les artères extérieures arrivait au centre de ces loges et indiquait assez bien qu'elles semblaient appartenir à autant d'artères distinctes. L'altération des artères appartenait donc ici moins aux branches extérieures qu'aux divisions qui pénètrent les os et qui se distribuent dans leur substance."

"Geneviève Lamiral, âgée de trente-trois ans, entra à l'Hôtel-Dieu le 5 Juillet 1825. Cette femme fit, dix mois avant son entrée dans l'hôpital, un faux pas dans lequel le talon étant fortement tiré en arrière et le pied étendu sur la jambe, tout le poids du corps porta sur l'extrémité digitale du pied gauche; elle entendit alors, assure-t-elle, un craquement dans le pied, et y ressentit une vive douleur. Le pied se tuméfia rapidement, devint rouge, douloureux; l'on appliqua sur cette partie des sangsues, puis des résolutifs; mais le repos ne fut pas observé.

"Trois jours après cet accident, une tumeur parut dans la direction du second orteil; elle était, suivant la malade, mobile et pulsative; elle augmenta successivement de volume pendant cinq mois, son développement cessa alors, et la tumeur resta comme elle était encore lorsque la malade entra dans l'hôpital. Avant de venir à l'Hôtel-Dieu, cette femme avait consulté un grand nombre de médecins, et presque tous pensèrent que la maladie était un anéurisme. Un très grand nombre de sangsues fut appliqué; on en mettait de trente à quarante sur la tumeur, et à chaque application les battemens de la tumeur et la douleur étaient

affaiblis, mais deux ou trois jours après ces mêmes symptômes reparaissaient. Les émolliens, puis les résolutifs, ont été mis aussi à contribution et sans plus de résultats satisfaisans. Lorsque nous vîmes la maladie, sa tumeur était située au dos du pied sur les deuxième et troisième os métatarsiens, s'étendant latéralement du premier au quatrième os du métatarse, et d'arrière en avant d'un à deux pouces au-devant de l'articulation tibio-tarsienne, jusqu'à la base des orteils, saillante d'un pouce environ au-dessus du dos du pied, adhérente par sa base, sans chaleur, rougeur, ni alteration de la peau.

“ La tumeur explorée avec plus de soin, on reconnut des battemens profonds, obscurs, mais cependant distincts. M. DUPUYTREN pensa d'abord que les battemens n'existaient que dans la direction de l'artère pédieuse, et que la tumeur était un abcès, derrière lequel était placée l'artère qui lui imprimait un mouvement de soulèvement. Quelques personnes crurent que la maladie pouvait bien être de nature anéurismale ou fongueuse. En effet, la tumeur offrait évidemment des pulsations comme on présente une tumeur anéurismale et dans toute son étendue, et l'artère pédieuse déplacée et portée en dedans et vers le sommet de la tumeur laissait distinguer des battemens distincts de ceux de la tumeur, qui, comprimée sur toute sa surface, soulevait la main par des mouvemens d'expansion, en tous sens isochrones aux battemens de pouls, et le doigt promené sur tous les points de la circonférence de la tumeur sentait très bien ces battemens, qui cessaient aussitôt qu'on comprimait l'artère tibiale antérieure. Le malade se plaignait de douleurs très aiguës qui, suivant elle, la privaient du sommeil.

“ De nouveau examinée par M. DUPUYTREN, la tumeur parut d'un diagnostic moins clair et moins facile à établir ; ce praticien fit descendre la malade dans l'amphithéâtre, et

dit qu'il ferait d'abord à la tumeur une simple ponction exploratrice qui n'empêcherait pas de découvrir, et de lier le vaisseau s'il était le siège d'un anéurisme. Un appareil fut disposé à cet effet, ainsi qu'un autre pour l'amputation, si cette opération était jugée convenable, dans le cas où la tumeur aurait son siège dans les os. La compression de l'artère crurale faite, la lame d'un bistouri fut plongée au centre de la tumeur, et il ne s'écoula qu'un peu de sang noir en nappe et point en jet ; la compression de l'artère crurale fut suspendue, et l'écoulement du sang ne devint sensiblement ni plus rapide, ni plus abondant. M. DUPUYTREN agrandit l'incision à l'aide d'un bistouri boutonné, et reconnurent une affection profonde dans les os, se décida à pratiquer immédiatement l'amputation partielle du pied, et elle fut faite suivant la méthode de CHOPART. Aucun accident n'est survenu ; il y avait un commencement de cicatrisation au sixième jour, et pourtant elle n'a été complète qu'à la fin de la sixième semaine, époque à laquelle la malade est sortie de l'Hôtel-Dieu.

“ La portion enlevée fut examinée avec soin, et permit de constater que dans le lieu où aurait dû se trouver le corps du deuxième métatarsien était une substance analogue à celle qui avait été arrachée, et l'on sentait çà et là sous les doigts les débris d'une matière osseuse. On rencontrait surtout ces débris vers l'extrémité de l'os supportant l'orteil, et cette partie était cependant saine, ainsi que le cartilage diarthrodial et l'articulation elle-même.—A l'extrémité postérieure de cet os, le mal avait atteint simultanément le premier, le deuxième et le troisième métatarsiens, ainsi que leurs articulations avec les os cunéiformes, et dans ce point la maladie consistait en un ramollissement de la substance spongieuse ou celluleuse avec diminution de ce tissu. A la partie postérieure de premier os du métatarse, cette diminution

était portée à un point tel, qu'il existait là une véritable cavité anfractueuse, pouvant contenir une noix, bornée en arrière par une simple lamelle osseuse, saine en apparence, supportant le cartilage diarthrodial exempt de toute altération.—L'extrémité postérieure du troisième métatarsien était creusée, offrait une cavité de même genre, moins étendue, donc la face interne était recouverte par un sang grumeleux et lamelleux. Le premier os cunéiforme, détruit en partie, était aussi ramolli et raréfié, si l'on peut se servir de ce mot, et sa substance spongieuse ressemblait au tissu vasculaire d'une rate, dont le lavage n'aurait laissé que la trame ou le réseau fibreux et solide. Le deuxième cunéiforme était moins malade, et le troisième bien moins encore ; cependant leur altération portait les mêmes caractères que celle du premier de ces os.

“ Les muscles et autres parties molles paraissaient être restées étrangères à cette altération ossivore, et l'on n'a remarqué dans l'artère pédieuse aucune altération capable d'expliquer les battemens de la tumeur ; cependant M. BRESCHET, qui, après nous, a examiné les parties amputées, a reconnu l'exactitude de tout ce que nous venons de rapporter, et de plus, il a vu que le tissu dont les cavités osseuses étaient remplies était manifestement fibreux et vasculaire.”

In the Museum of the Royal College of Surgeons of this city, are two preparations of Osteo-Aneurism. In the one case, the disease affects the metacarpal bones of the hand of a young man, which was amputated by Mr JOSEPH BELL. There was no pulsation in the tumour : but on being punctured, it discharged some dark coloured blood. Upon dissection, blood was found in a fluid state, filling numerous distinct bony cysts, each of which was lined by a highly vascular membrane.

The second of these cases occurred in the practice of Mr

GEORGE BELL, several years ago*. “Mr S——, æt. twenty-two, took a good deal of exercise on horseback. The buckle of the stirrup-leather, on the right side of the saddle, was so placed that it exerted considerable pressure on the middle of the inside of the thigh. A good deal of local uneasiness, with swelling, was the result. The surgeon in the country prescribed leeches and various kinds of embrocations. These proved of no avail, for the swelling in the course of three months attained a great size. He came to town, and was seen in consultation by various practitioners; during a fortnight the swelling obviously increased. As the tumour occupied the whole of the thigh, and exhibited no signs of diminution, it was proposed to amputate the limb at the hip-joint. To this the patient gave a willing assent, but died suddenly three days after the operation was proposed to him, and on the very day it was to have taken place.

“On examining the thigh, it measured thirty-nine inches in circumference. The tumour was hard in some places, and in others communicated that peculiar crackling feeling so well described by BRESCHET. It could not be divided by a knife, and much difficulty was experienced from its hardness in making a section of it by means of a saw. The parietes of the femur, covered by the periosteum, were expanded; and the internal structure of the tumour consisted of an immense number of cells, which were lined by a membrane, and were filled with florid arterial blood; one cell contained upwards of a pint of blood.”

MR BENJAMIN BELL † relates a case of this disease, which occurred to his father MR GEORGE BELL, in the year 1823. “The patient was a lady about sixty years of age, who, for several years, had suffered from what she imagined to be

* See BELL's Treatise on the Bones, (already quoted) p. 161.

† Idem Liber, p. 157.

rheumatism of the upper arm of the right side. The arm was painful on being handled, and a feeling of aching was referred to the bone. In the course of several months after the first symptoms of the bone being affected had appeared, the upper arm began to swell, and the enlargement went on progressively increasing, until the middle portion of the diseased humerus measured more than double the circumference of the sound one. She suffered considerable uneasiness in the part, and the pain extended downwards to the points of the fingers. The surface of the tumour was not discoloured, but several large and swollen veins coursed over it. Before applying to my father she had consulted a bone-setter, who recommended frictions and shampooing. This practice, the patient affirmed, had the effect of exasperating the disease, and of inducing intolerable pain. Although the real nature of the complaint was not suspected, still, as it was on the increase, it was deemed proper by several surgeons assembled in consultation to amputate the limb. My father accordingly removed the arm at the shoulder-joint. The patient recovered in a short time from the operation, and suffered no return of the complaint, but died two years afterwards from pleuritis.

“ In order to ascertain whether any connexion existed between the great vessels of the limb and the tumour of the bone, I injected the arteries of the arm from the humeral artery, with a preparation of glue and vermilion. The injection ran kindly, and flowed through the minutest of the distal arterial ramifications. The tumour was found to be confined entirely to the bone. It was, when divested of the soft parts, nine inches in circumference, and six in length. The periosteum was entire, and somewhat thickened. On cutting into the tumour, the scalpel grated upon what

seemed to be osseous depositions, which pervaded its tissue ; but its general texture was of a fibrous character.

“ A thin, though imperfect, shell of bone, which was internal to, but in immediate contact with, the periosteum, nearly coated the tumour. There was a large cavity in the centre of the tumour, lined by an organized membrane, into the vessels of which the size injection had flowed : and the cavity itself was filled, partly with fluid blood of a dark colour, partly with concentric coagulæ, and partly with hardened injection.” From the morbid appearances presented in this case, our author regards it as a true specimen of the disease described by BRESCHET, viz. Osteo-Aneurism.

In the Museum of St Bartholemew's Hospital two specimens of this disease are preserved ; though, as respects their history, we merely learn, that “ during the lifetime of one of the patients, pulsation was very evident in the tumour *.”

Mr SAMUEL COOPER † very briefly refers to a case apparently of Osteo-Aneurism in the leg, seen by his friend Mr VINCENT. “ The disease resembled Aneurism in the circumstance of pulsation, but was attended with destruction of a part of the tibia, and a moveableness of the separated ends of the bone.”

Dr JEFFREY of Glasgow gives the following short narrative of a case of disease answering to the description of Osteo-Aneurism ‡. “ An old woman, of about fifty years of age, was rode down in the streets by a cart, and her arm broken in two places. One of those fractures was about two inches above the elbow, the other was above the middle of the arm, and the whole bone was greatly shattered ; yet this poor creature had no assistance, no Surgeon was called,

* Id. lib. p. 156, and COOPER'S Surg. Dict. (1825) p. 120.

† Loc. jam cit. ‡ J. BELL'S Principles of Surgery, vol. iv. p. 407.

the arm remained unattended to for six weeks, when a Surgeon in Glasgow visited her, and found the arm greatly swelled, so that he could neither distinctly understand the nature of the injury nor the condition of the bone; it was presumed that there was a fracture, and the patient was laid in a posture favourable to the reunion of the bone. The tumour never subsided but increased, occupied the whole arm from the elbow to the top of the shoulder; pulsation was distinctly felt at the top of the shoulder, but of such a kind as might proceed from some artery near the surface. It was judged to be really so; the idea of an Aneurism certainly had never struck the gentleman who attended her, for he opened the tumour, which was soft and fluctuating; there was no doubt of its containing a fluid of some kind or other; the lancet was struck into it, but instead of matter, as was expected, blood flowed in a full stream. This puncture healed up easily, the tumour which had subsided, when it was thus imprudently opened, soon filled up again to its full size, and the hand and fore-arm became œdematous and cold. In this condition the patient survived five months, the tumour pulsating manifestly, especially in its upper part; but how this woman died, or after what kind of sufferings, is not related in the case.

“On opening the body after death, eight months and more having elapsed from the time of the fracture, a profusion of mixed and putrid blood, like coffee-grounds, was discharged. Two inches of the lower part of the bone retained its natural form, all the middle part of the bone was destroyed, the head only remained on the upper part of the tumour, but with its cancelli quite eroded, nothing being left but the mere shell. Through the whole length of the bone the cancelli were completely dissolved, and the outer

bony lamina was found adhering to the whole inner surface of the sac ; many pieces of the bone were found in the heart of the tumour, and on the fore part and middle of the tumour was found one piece of bone two inches and a half long, and nearly two broad. Although the humeral artery was injected, it could not be perceived from what branch of it the tumour was produced." The morbid parts are preserved in Dr JEFFREY's Museum, and if examined along with the account given of the case, will be found to afford a very clear and interesting illustration of the nature and progress of this affection.

The last case of Osteo-Aneurism that I have succeeded in discovering, is contained in the same valuable collection with the preceding example. Through the kindness of Dr MARSHALL of the University of Glasgow, I was permitted to examine the extensive series of diseased Bones there preserved ; and it is from his knowledge imparted to me of the previous history of this particular case, and of the morbid appearances which it presented immediately after death, that I am enabled to introduce an account of it here.

A young man applied to Mr ANDERSON for a sore along the course of the left Tibia, extending from the knee nearly to the ankle, and of considerable breadth. This sore, in nearly its whole length, exposed the cavity of the bone, presenting many dilated nutritious arteries, that frequently bled to so great an extent as to threaten the patient's life. The history he gave of it was, that about nine years before, his leg had been pricked by a thorn, about four inches below the knee, and that through neglect, the part had become severely inflamed, and had formed an ulcer, which gradually enlarged to the size described. Many medicines, both external and internal, had been tried, but

without good effect, and Mr ANDERSON was at length constrained to amputate the limb.

The bone, on examination, presented along three-fourths of its anterior surface a deep excavation, lined by a fine villous membrane, studded with small points, from which had issued, during life, the occasional sanguineous discharge. The bone has been now macerated, and presents merely that acicular appearance over the diseased surface which is not altogether peculiar to this disease of the Osseous tissue.

PART II.

I now proceed in the Second Part of this Essay, to deduce from the facts already brought forward, what may be regarded as the usual course of symptoms, the general structure and mode of development of Osteo-Aneurism, the causes tending to its formation, with the line of cure proper to be adopted in the treatment of this very formidable and fatal disease.

I. SYMPTOMS.

Osteo-Aneurism is usually situated at the posterior part of the leg, below the knee ; implicating the upper portions of the Tibia or Fibula, or both. Sometimes the disease occupies the Femur ; next in point of frequency, the Humerus ; and apparently more rarely, the bones of the Fore-Arm ; the Metacarpal and Metatarsal bones, the Scapula and Cranium. It has been observed chiefly in Adult subjects.

The disease, at its commencement, appears as an inconsiderable deep-seated swelling. On pressure, it is, in some cases, very painful, though occasionally but little so, and at times has been found even totally insensible. At an early stage of the complaint, the patient experiences neither pain nor embarrassment in the motions of the part.

The tumour increases gradually, and in proportion as it does so, appears quite perceptibly to be attached to the

bone. In a short time the cutaneous veins on its surface, frequently indeed those over the entire limb, are conspicuous and swollen ; and as the disease advances, they become tense and varicose. The tumour progresses rapidly to its full size ; in some instances, in the short space of six weeks, but in other instances it may continue enlarging during six or eight years.

When it is completely formed, the pain is then augmented to such a degree, as to deprive the patient of sleep ; and on pressure, the suffering is frequently more exquisite than the external swelling can account for. We likewise find, at times, pain following the course of the principal nerves, together with coldness and numbness of the extremity. In most cases a pulsation, synchronous with that of the heart, is perceptible in the tumour, but ceasing on the principal artery of the limb, above the disease, being compressed. In the early stages of Osteo-Aneurism, the pulsation is deep-seated and partial, and generally felt at those parts only of the tumour as are soft, and not covered by a bony shell ; but when the disease has advanced considerably, it is then general. We must keep in mind, however, that pulsation is far from being a constant and invariable symptom.

The affected limb is sometimes œdematous, sometimes emaciated, and the skin covering it, though in a few cases not altered, yet for the most part loses its natural colour, assuming a reddish-violet hue ; and the apex of the tumour itself becomes sensibly thin, shining, and of a purple colour. All voluntary movements are nearly obliterated in the limb, which is involuntarily thrown into severe and painful cramps, from the elevation and expansion of the bellies of the muscles over the tumour. The motion of the joints, in the vicinity of the disease, is also constrained and difficult.

On applying pressure by the finger, the tumour yields

with the feeling, and sometimes with the sound of crepitation, denoting that it is covered in whole or in part by a bony shell. On further examination, a sensation is conveyed to the surgeon's hand, of the swelling being at parts of its circumference hard and firm, as if formed of solid ossific matter; and elsewhere again a fluctuation is felt, as through a medium of an elastic and not very compressible nature, like cartilage.

If a bistoury be plunged into the tumour, some florid blood, generally small in quantity, and not issuing *per saltum*, mixed with black blood in different degrees of coagulation, are discharged from the wound. If the incision be enlarged, or if, as is the case when a bone superficially situated is affected, the interstitial pressure has been followed by ulceration of the integuments, then a soft, reticulated, bleeding, and fleshy tissue, not unlike the substance of the Placenta, presents itself: and upon this being sponged out, the hæmorrhage is seen to proceed from the surface of the sac, gushing forth with considerable force. Dense ossifications or bony spiculæ, or mere coagula of blood, are singly or conjointly felt through the opening.

If the tumour be allowed to open of itself, a profuse bleeding takes place, recurring every second or third day: the patient is from time to time alarmed with slighter hæmorrhages (as in common Aneurism), which becoming more frequent and profuse, together with the irritation which the diseased mass already formed exerts, in increasing every hour the rapidity of its growth, would soon of themselves destroy the patient.

But to these local consequences are superadded general symptoms, which considerably hasten the destruction of the victim of this disease. At the first attack of Osteo-Aneurism, the general health is good; but shortly after,

owing to the reaction on the constitution of the violent pain and suffering which are endured by reason of the unremitting attacks of the disease, the vital energies are much impaired; the countenance becomes pale and dejected, and the habit of body thin and weak; pyrexia runs very high; debility, emaciation, diarrhœa, and hectic symptoms, advance apace; and at length the unhappy sufferer sinks, completely exhausted.

Although amputation has been performed, still the disease generally recurs, and that without any evident cause. In some cases it returns immediately, while in others not until the lapse of some years. The stump becomes enlarged in size, is painful and tender to the touch, and, when handled, a deep crepitation and pulsation are felt in it. Small black specks next appear on its surface; these give way, and violent bleeding frequently occurs, which carries off the patient. Or, the stump assumes a deep purple colour, proceeding from a great extravasation of blood; this prognosticates speedy gangrene, which expectation is accordingly fully realized.

II. APPEARANCES FOUND ON DISSECTION.

The Morbid phenomena exhibited on the examination of Osteo-Aneurism after amputation of the affected limb, likewise as seen in those cases of the disease which have terminated fatally, are the following.

The Dimensions of the tumour vary from the size of an orange up to thirty-nine inches in circumference. It has, however, been often found to measure less after amputation or death, owing naturally to the sac becoming flaccid from the escape of the blood.

The Skin over the disease is found to have undergone merely a consecutive alteration, the result of distension; for it is thin, tense, and shining, seldom, and then but partially, adherent to the tumour, and here and there is traversed by bluish lines.

The cellular adipose tissue is deficient in quantity over the tense part of the tumour, but more abundant than natural at other parts: its texture is sometimes engorged and hardened, at others of a compact or even fibrous consistence.

The Muscles are thin, soft, and destitute of their proper fibrous and fleshy appearance.

The Periosteum covering the tumour is entire, and continuous with that of the rest of the bone above and below the disease. Both this membrane and the external aponeurotic expansion are generally somewhat thicker and firmer than in the healthy state; and sometimes they pass into a fibro-cartilaginous condition.

The Sac of the Aneurismal swelling is situated within the substance of the bone. It is either a distinct cyst, or consists of a congeries of irregular caverns, divided by septa. The capacity of a single cyst varies from three and a-half fluid ounces to half a pound or more. In all cases, the shell of the tumour is in immediate contact with the internal surface of the thickened and dense Periosteum.

In structure, the sac varies as well as in form and size. Its parietes are composed at one time of an outer thin, smooth, and compact shell of bony matter, (containing little earth), and covered by the dense Periosteum; and of an inner surface studded with short projecting spiculæ, arranged in strata pointing to the cavity. By this distribution of the osseous matter, a very elegant structure, a species of bony vegetation, is formed. At another time, (when

the tumour is not furnished with an entire bony covering), its parietes consist partly of the fragments of the external table of the bone, here and there attached to the Periosteum, and partly of thick and dense fibrous matter, elastic like a thin lamina of cartilage. This state of parts conveys to the hand on pressure, the peculiar crackling sensation given on crushing an egg-shell. At another time, the Periosteum is from three to six lines in thickness, fleshy, and quite covered with arterial vessels, and forms the external part of the containing membrane; while internally, the surface of the sac is villous, and irregularly spongy, like the uterine surface of the Placenta. In the middle of this sac fragments of the bone lie, partly absorbed, and covered by fluid blood and coagula.

When there is a plurality of sacs, they appear as if blown up into honeycomb cells, extending sometimes from the bone among the muscles of the limb. Besides bone, they are composed of various soft degenerated textures; of tissues of either a fibrous, a fibro-cartilaginous, ligamentous, or carcinomatous nature.

The phenomena presented by the Bone itself, within whose tissue this disease is developed, are these. On cutting open the tumour, the knife grates upon osseous depósitos, which pervade its structure. The bone is sometimes destroyed through all its thickness, and entirely lost in the tumour. If it be not wholly annihilated, so much of it is affected as to allow the fingers to be pressed quite through its substance; or it is found rough, corroded, and in considerable part destroyed; or else a mere shell of osseous matter, formed as it were of the expanded table of the bone, is substituted in its place. Its cavity is enormously enlarged, and its cellular tissue is as if excavated or inflated, so as to form either one or more cells, which are

filled partly with fluid blood of a dark colour, or fluid arterial blood; partly with hardened injection (if the vessels of the limb have been previously so prepared); and partly with coagulated blood disposed in concentric layers, the external paler than the internal, just as in old Aneurismal tumours. When there are more than one cell, some of them may contain gelatinous matter.

In every case of Osteo-Aneurism, the principal Vessels of the limb, throughout their whole extent, have appeared perfectly sound*; and, when minutely injected and dissected, have been seen to pursue their natural course without presenting any solution of continuity. This is not the case, however, with the small arteries which penetrate the bone and supply its substance: it is to these that the morbid alteration of the Vascular system is confined. They are increased in number, are more voluminous than usual, and open by many orifices into the aneurismal sac. This is well seen if the tumour has been perpendicularly split before injection, when, if water or fine injection be employed, the fluid is seen to issue by a multitude of points from the internal surface of the sac; these points of escape appearing to be the mouths of many minute capillary arteries. This conformation of parts forms a highly vascular membranous lining to each cyst, resembling a finely developed fibrous web or network, into some of the lacunæ or cellules of which the injection is observed likewise to be effused.

The Venous System of the diseased limb is enlarged to double its natural size. The veins are very flexuous, without presenting that knotted appearance which is observed

* In one or two cases, extensive depositions of calcareous matter have been found in all the arteries of the limbs; but beyond this not unfrequent occurrence, these vessels have undergone no further morbid alteration.

in this class of vessels when in a varicose state. Those of the diseased mass are greatly dilated, without being in a morbid condition. Enormous branches, which, in the healthy state, are mere capillaries, arise from the depths of the tumour, surround its several portions, and run into a venous trunk.

The Nerves are usually unaffected, excepting in cases where their displacement, elongation, and flattening, are accomplished by the growth of the tumour*.

The Articulation which is in the vicinity of the disease has always been found healthy, even when separated from the seat of the malady solely by an expansion of cartilage. When Osteo-Aneurism occurs at a joint, its Ligaments are prodigiously thinned, and converted into mere membranes. Sometimes they are distended in the form of a shining cyst, jutting out irregularly at different points, and occasionally undergoing a carcinomatous and tubercular degeneration.

No Visceral lesion is found ; but generally all the organs are pale, and almost deprived of blood.

On examining the Stump of a patient who has died soon after amputation has been performed, nothing beyond the ordinary appearances have presented themselves : but it is otherwise when the patient has survived this operation for some years. In the latter case the disease is found to have recurred, presenting either its original form, or else it has effected a complete removal of the substance of the bone, up to the vicinity of the next joint. In cases where the bone is entirely absent, the periosteum is found much thickened and interspersed with largely dilated bloodvessels,

* In one case, however, the Sciatic has been found more voluminous than usual, and to have undergone a lardy degeneration.

and serving as a sort of capsule or sheath inclosing clots of blood.

From the above inquiry into the structure of Osteo-Aneurism, I may proceed to a consideration of its causes, probable mode of development, and precise nature. Although all the cases of this disease which have been brought under notice may differ from one another in a few relations; nevertheless, from looking carefully to the many circumstances common to them all, some satisfactory conclusions upon these points may perhaps be formed.

III. PREDISPOSING CIRCUMSTANCES.

We never find that Osteo-Aneurism arises from original malformation; and it is difficult to allow the existence of any constitutional predisposition to this disease, for in most cases an exciting cause, sufficient to account for its origin, can be traced. As, however, in some few instances, no local injury can be ascertained to have been inflicted at any previous period of life, the appearance of Osteo-Aneurism may be said to be occasionally owing (as in the case of Aneurism properly so called) to a natural weakness in the arterial system; to disorganization of the coats of the capillary arteries of the bone from an internal cause; or to a secret disposition prevailing in the system, which is accidentally developed into activity by an injury of the part.

In support of this view, we find that *that* sex and period of life are more liable to the invasion of this disease, which, from the more frequent exposure to accident, and the greater severity of occupation attending them, are prone to Aneu-

rism generally ; that is, a half more of the cases of Osteo-Aneurism have occurred in men than in women ; and the adult period of life appears, in both sexes, to be that most subject to the complaint.

IV. CAUSES.

This morbid structure generally appears to have succeeded, after a greater or less period of time, the application of external violence of some kind ; such as a fracture, a strain, a simple blow, or any other injury even less obvious. Occasionally it exhibits itself as one of the sequelæ (as is supposed) of Gouty or Rheumatic affections ; and in some cases has arisen without any assignable cause.

That such injuries as I have enumerated are capable of producing this disease, is a view of the case which there can be no hesitation in admitting ; because, allowing for the circumstance of bones being composed of hard, earthy, insensible matter, and also for their peculiar situation, their bloodvessels and nerves are as capable of being acted upon by common causes as the same parts in any other situation * ; and this is the more likely from their being in-

* “ The small space occupied by the bloodvessels of the canals, compared with that which is found to be allotted to the secretions and membranes of these cavities, distinctly prove that the circulation must, under all circumstances, enjoy as much freedom here as elsewhere ; and the intimate connexion formed by these canals between all parts of the bones and the surrounding soft parts, affords the strongest ground for believing that the minute vascular and membranous organization of the bones is as susceptible of impressions from irritation, or sympathy, as the muscular, glandular, or other soft structures of the fabric.”—*Howship's Observations on the Morbid Structure of Bones ; Lond. Med. Chirurg. Trans.* vol. viii. p. 62 ; 1817.

fluenced by common remedies, allowing only for difference of situation. And it may be added, that although Osteo-Aneurism, like diseases which are consequent upon injuries, may sometimes shew itself independent of such injuries, that is, spontaneously, yet it more generally appears to be the consequence of external violence purely local.

Having seen that the slightest accidental cause may produce a disturbed circulation in the bone, giving rise to some affection of that tissue, I shall next inquire into the nature of the diseased action undergone by the bone in the present case.

V. NATURE OF OSTEO-ANEURISM.

Under the commonly employed term, Proximate Cause, or simply the Theory, Explanation, or Nature of a Disease, is here included the important inquiry into the intrinsic nature of this affection, that is, the actual condition of the part affected as compared with the state of health.

The action occurring in the interior of Bone so as to develop this disease, is in all respects difficult of explanation. Mr JOHN HUNTER, who was most intimately acquainted with the principles of diseased action in that tissue, frankly acknowledges himself at a loss how to explain some of those changes that bone undergoes in disease. It is therefore with all proper respect for him and other authorities, that I make the attempt in connexion with the present subject, being convinced that it is only by obtaining an acquaintance with the intrinsic nature of this as of other diseases, that we are enabled to practise on sound and rational principles.

We know that in parts morbidly excited, as in Phlegmon

of the soft parts, an unnatural size takes place in the living and active vessels. The arteries of small caliber work powerfully and are enlarged in diameter; their corresponding veins are proportionally dilated; and the number and activity of both sets of vessels are, by their frequent communication and anastomoses with one another, slowly increased, being generated in parts where they were not known in the healthy state. Now such appears to be the condition of parts in the present disease: it is probable that an inflamed state of the internal coat of the Arteries, with an unhealthy degree of vascular distention in the bone, is excited by some of the causes above detailed, whereby its interior action is disturbed; the consequence then is, that an unusual action follows in its capillary arteries, inducing the mutual enlargement of both the arteries and the veins, and which may give origin to this fatal disease.

The increase of the tumour is maintained by the destructive violence with which the vascular system of the part acts, whereby sooner or later some of its minute capillary vessels become ruptured. The morbidly excited action already produced, combined with the irritation caused by the presence and pressure of the blood, which is continually being poured into the interior of the bone through the ruptured Arterial capillaries, render this dense tissue easily conveyed away piecemeal by absorption: a certain allotment, however, of the arteries of the original bone appear to remain active and ready in secreting new osseous matter, in the same manner as it is secreted in the growth of bones generally,* and in proportion as the original fabric is destroyed. This substitute for the annihilated bone is, how-

* See SYME on Necrosis, 8vo. Edin. 1823; and SCARPA, de Anatomia et Pathologia Ossium Commentarii, 4to. Ticini, 1827.

ever, now modelled into a more convenient form: it assumes (conformably to the law Nature exhibits, of accommodating parts to the changes occasioned by morbid action) the shape of a thin and expanded osseous shell, serving as a sac around the apparatus of morbidly active vessels and collections of effused blood.

At this stage of the disease, when the structure of the part is thus broken up by local capillary development and excess of vascular action, the state of parts within is evinced by the excessive pain experienced by the patient. The blood filling these cavities or reservoirs seems to be poured into them through the innumerable arteries passing from the bony substance, and which form the basis of the network of vessels developed around the interior of the Aneurismal tumour. It is from the synchronous movements of dilatation and contraction of all these small arteries that the obscure throbbing in the beginning of the disease, and which becomes in the latter stages a strong and deep pulsation, results.

The further increase of the disease is maintained by these vessels taking on a new and more violent action; and the circulation in them being occasionally more highly excited, the tumour goes on enlarging to an unlimited size. Its osseous substance becoming thinner and as it were dilated, raises and flattens the parts about it; but its increase is limited in the direction where the greatest resistance is opposed to its destructive growth (as when confined beneath the bellies of large muscles like the *Gastrocnemii*), from which cause the osseous tumour is sometimes divided into two parts, making in this way a double projection externally. According as the degree of resistance to the extension of the disease is great, so is the destruction within proportionally rapid. When, however, the parietes of the tumour are stretched out by the force of the circulation to

an extent beyond which their texture is incapable longer of bearing any greater elongation, they then undergo more unfavourable changes; for, becoming still thinner, they have finally an opening formed in them by absorption. Hence those occasional hemorrhages which I before mentioned as marking the progress of the complaint.

Respecting the nature of the disease in the adjacent soft parts, the changes which these undergo are more or less secondary, being dependent upon the primary affection of the bone. With regard to the Periosteum, which organ alone calls for particular notice, it may be remarked, that although the bone and its investing membrane are found to participate mutually in many of the affections of one another, still a different set of vessels seems to supply the two tissues.* This membrane remains in Osteo-Aneurism entire, and in a state of perfect vitality; it suffers as the consequence of distention merely, a cause which, in living matter, while it extends the substance, increases its bulk, by accelerating vascular action, and exciting the nutritive process.†

After what I have already said, a very few words may suffice to explain my views as to the exact nature of Osteo-Aneurism.

The facts which may be urged in proof of the analogy between Osteo-Aneurism and Aneurism properly so called, and therefore of the Aneurismal character of the former disease, are, in the first place, the *Symptoms* of the two affections. Thus, both derive their origin more frequently from violence than internal disease: other analogous symptoms

* See works cited in the preceding Note.

† See Dr WILLIAM HUNTER in the Med. Obs. and Inq. vol. i. p. 342, on the thickening of parts from this cause.

are, the sudden rise and increase of both tumours; the swelling of the whole limb; and the pulsation, when present. Secondly, the *Structure*; for immediately on the great vessels of the extremity being divided, the Aneurismal bag becomes in both diseases depressed and flaccid, in consequence of the blood regurgitating from it by the artery; proving that, in Osteo-Aneurism, the arterial blood is easily and in great quantity poured out into the cavity of the tumour, by means of the extraordinary enlargement of its arteries. Thirdly, the effects of the *Treatment* employed; for a stream of hot arterial blood issues from the tumour when laid open at a particular stage of its growth in either of the two diseases; and likewise in both maladies has the ligature of the principal trunk succeeded in particular instances in arresting their further progress. These appear to furnish sufficiently cogent reasons for instituting a comparison between the two affections.

I am inclined, then, to class Osteo-Aneurism among the diseases of the Arterial system; and the only point in which it differs from Aneurism may be declared to be its local seat. Its origin is to be ascribed to the agency of the Capillary arteries solely; which, through an anormal action of the usual nutritive process to which these vessels are subservient, have become dilated, and are finally ruptured as the disease advances.

In concurrence with the view now adopted of the intrinsic nature of Osteo-Aneurism, I shall conclude this part of the subject, by defining that disease to be:—*Genuine Aneurism of the Capillary arteries appointed for the secretion of the Osseous tissue.*

Having already extended the present inquiry to so great a length, I must be as brief as possible in treating of the Diagnosis, Prognosis, and Treatment.

VI. DIAGNOSIS.

Osteo-Aneurism affords a striking instance of the difficulties that sometimes occur in our attempts to discriminate diseases ; for, in the present state of our knowledge, there are few marks by which we may distinguish this from some other affections of the bones.

The different maladies to which Osteo-Aneurism bears, in some particulars, considerable resemblance, and with which, consequently, it may be confounded, I shall enumerate, for the purpose of giving some idea of the difficulty of the Diagnosis, as well as in order to point out the relations in which these diseases happen to differ from that under consideration.

This morbid structure frequently does not develop itself until long after all the usual consequences of violence have subsided, resembling in this particular circumstance both Cancerous and Scrofulous action, which often take their seat in parts debilitated by injuries ; although in Cancer, the peculiar hardness of the part, with the offensive discharge issuing from it, and in Osteo-Aneurism the general absence of such signs, as well as of Scrofulous or Syphilitic symptoms, are sufficiently distinguishing features.

The characters of the present disease are more apt to be confounded with Fungus Hæmatodes, also a very frightful disease, and the indications afforded by the external examination of which, resemble in so many points the symptoms of Osteo-Aneurism, as to have been hitherto a main source of fallacy to the Surgeon in detecting the latter affection. But an examination of the substance of these tumours immediately proves the existence of a wide distinction between them ; for while the one disease commences in the system of the bone itself, and thence extends itself in consequence outwardly, the other

is an affection appertaining originally to the soft parts, which makes its progress by reducing and amalgamating into its own nature every structure it meets*, thus affecting in the bone an alteration approaching to complete solution of its substance, although the change which that tissue undergoes is merely a consecutive one.

There is another important affection liable to be mistaken for Osteo-Aneurism. This is Aneurism within the lacrated Periosteum, arising from comminuted fracture of a bone, accompanied with wound of a great artery; for, from the want of reunion among the splinters of bone, they are found at a great distance of time floating loose, as if half dissolved in the Aneurismal blood. Injection of the Artery must be had recourse to in such a case; and if by this means the continuity of the vessel throughout its whole length be demonstrated, the disease is then incontestibly proved to be Osteo-Aneurism.

Besides those mentioned, this disease has likewise many features in common with Osteo-Sarcoma, (the Fungous Exostosis of the Medullary membrane of COOPER†,) with accidental bloody Fungous tumours‡, and with Hæmatoma or blood cyst§. With Spina Ventosa, and some other of the diseases of the bones before referred to, with Aneurism from Anastomosis of the soft parts, and with common Aneurism of interosseous or other deep-seated arteries, the disease has also been confounded.

During the life of the patient, or the entire state of the

* Sir C. BELL's Surg. Obs. vol. i. p. 369, Lond. 1816;—also Note to p. 12 of this Essay. † Sir A. COOPER's Surg. Essays, pt. i. p. 165. On

the identity of these two diseases see Dr CUMIN in Ed. Med. and Surg. Journal, vol. xxiii. p. 17. ‡ Boyer, *Traité de Mal. Chirurg.* vol. ii.

p. 318, &c. § CRAIGIE's Elements of General and Pathological Anatomy, p. 216, 8vo. Edin. 1828, &c.

diseased parts, great difficulty, it is to be feared, will be experienced in indicating the difference between the foregoing diseases and the present ; and it is only by exploring the tumour by the bistoury, or by dissection of the morbid structure, that we can obtain unequivocal evidence declarative of its real nature.

The diseases from which Osteo-Aneurism is easily capable of being distinguished during life, are Aneurism from Anastomosis, and common Aneurism *.

From the former of these, *Aneurism from Anastomosis*, Osteo-Aneurism may sometimes be distinguished by one or more of the following marks. *First*, it is never congenital, but only accidental ; *secondly*, in its distention it is at all times the same, and it does not present the phenomena of erection ; *thirdly*, it has been uniformly found by PELLÉTAN†, that “ not only the veins, but the trunks also, as well as the branches of the arteries which supply Aneurism by Anastomosis, are usually large and dilated,” a state of parts far from occurring in Osteo-Aneurism ; and *fourthly*, Osteo-Aneurism is a fixed swelling, and is not generally superficial, the reverse of the state of parts in Aneurism by Anastomosis. The broad line of distinction between the two diseases, as drawn from the examination of their anatomical structure, rests on the fact of Osteo-Aneurism originating in the substance of the bone.

* It would be improper to omit entirely the mention of a disease which presents some of the characters of Osteo-Aneurism, viz. the *Bleeding Venous Tumours on Children's heads*. (See J. BELL's Discourses, vol. iii. p. 336.—C. I. OEHME de Morbis Rec. Nat. Chir. p. 81, Lips. 1783.—HODGSON, (op. cit.) p. 447–8.—CHAUSSIER on the Veins and Tumours of the Diploe.—Memoir of Dr NÆGELE of Heidelberg.—HEISTER's Instit. Chirurg. &c.) Both affections have their seat in the bones, but the latter disease is curable by simple pressure alone ; resembling in this respect Nævi, and other smaller examples of Aneurism from Anastomosis.

† Clinique Chirurgicale, tom. ii. pp. 59, 66–8.

Between the latter of these diseases, *Aneurism*, and the affection under consideration, the existence of the three following points of resemblance, demands the adoption of some discriminating marks. *First*, the tumour in popliteal Aneurism, is not always clearly circumscribed, nor can it be always fairly traced to any connexion with the artery, the pulsation being suppressed by the straitening of the ham. *Secondly*, Osteo-Aneurism possesses sometimes so strong a pulsation as to afford room for conceiving it to be an Aneurism, or to be a plurality of Aneurismal tumours, when the disease, from the resistance of parts lying external to it, bulges out into more than one projection. *Thirdly*, "We often find many, and occasionally very extensive, ossifications of the coats of an Aneurismal bag, and sometimes it is of nearly a cartilaginous consistence*." The Diagnostic marks between Osteo-Aneurism and general Aneurism, may accordingly be given as usually these; the former disease is distinguishable from the latter by its investing skin being purple coloured, and traversed by bluish tortuous veins,—by containing a fluctuating fluid, felt through a crackling cyst,—and generally speaking, by not always throbbing.

The general Pathognomonic symptoms of Osteo-Aneurism, are, *first*, the tumour being at certain times painful, at other times totally insensible; *secondly*, on making firm pressure with the finger, the tumour yielding with the peculiar sensation formerly described; and *thirdly*, the pulsation when existent, being felt in those parts only of the tumour which are soft and not covered by an osseous shell, and being deep-seated, but perfect and distinct, synchronous with that of the heart, and accompanied by a feeling of expansion at each stroke; but we can place reliance on pulsation

* WILSON'S Lectures on the Blood and Vascular System, p. 389, 8vo. Lond. 1819.

as an indication of Osteo-Aneurism, only when this symptom is not ascribable to the impulse which swellings may receive from juxtaposition to a leading artery. However, it is only by having recourse to puncture, as exemplified in many of the cases I have related, or when the tumour has opened spontaneously, that we can determinately fix its true character ; and if upon this being done, a discharge of florid blood and organised coagula takes place, and destruction of the original bone be perceived, we can then be at no loss in recognising the disease as a case of Osteo-Aneurism.

VII. PROGNOSIS.

The Prognosis of Osteo-Aneurism is always doubtful. This may have been gathered from what has been already advanced in favour of the present disease being of the nature of Aneurism ; an affection which, like that before us, is often owing to a weakness in the arterial system, rather than to any local injury. Further, by attending to the result of the various lines of treatment which have been hitherto followed, from which it may be seen that in a greater or less time after even the most summary means have been adopted the disease has notwithstanding been reproduced ; sufficient data seem to be furnished us for entertaining rather an unfavourable Prognosis in a case of Osteo-Aneurism.

Certain circumstances, however, as to the seat, rapidity of progress, and extent of the disease, modify the degree of assurance with which we usually prognosticate the evil issue of the curative means which may be put in force : and may even in some cases lead to the presumption of a more favourable conclusion of the case. Thus, when the

size and seat of the tumour allow of the complete removal of the entire shaft of bone in which it resides, Surgical agency may be of avail in prolonging the patient's existence and perhaps in eradicating the disease entirely from the system ; although we have seen that we can never rest sure of its not returning, even though it be for a time wholly extirpated. But if the tumour is very large, and has its seat in a part where excision is rendered impracticable ; or if the disease has made so much progress towards the trunk as to debar us employing even the measure of Amputation, then nothing but a fatal result can be expected.

VIII. TREATMENT.

I regret that the conclusions I must arrive at under this head are so unsatisfactory, or at least so little flattering to our Professional skill ; for the truth is, Osteo-Aneurism has, even under the most eminent Surgeons, and apparently the most judicious treatment, proved generally fatal.

From the seat of this affection, it may perhaps be imagined that, like the other diseases of Bone, the one under consideration is capable of being influenced by ordinary remedies, at least in the first dawn of the disease ; but unhappily, we have every assurance given us that tumours of this peculiar nature, notwithstanding the employment of remedial means, never stop or even relent in their growth. We have seen, it is true, that some of the minor symptoms, as swelling, redness, and pain under pressure, and along the course of the nerves, are removable by the means usually employed to assuage mere local inflammation, as cold and hot applications, astringents, &c. ; no advantage, however, further than mere temporary benefit, has

accrued from such topical measures. Nor has pressure been found more serviceable ; which, so far from arresting or even for a time diminishing the progress of the tumour, is a source of much pain and irritation to the patient. Although, then, this agent be employed sometimes with advantage in common Aneurism, as well as in some other morbid conditions depending on increased arterial action, still we cannot hope for any beneficial result from it here ; for all the different varieties of compression which have been devised, labour under the disadvantage of operating at too great a distance from the seat of the malady, and are therefore totally incapable of exercising an influence upon the vessels composing the disease.

Indeed, one cannot reasonably expect that ordinary local agents should extend their action so deep as the vessels distributed to the osseous tissue, even in the state of excessive vascular action occurring in this affection ; but as a counter-irritant of great energy and power, and one which has been much employed, particularly by the continental surgeons, in the resolution of deep inflammations, it might not be altogether a fruitless trial to make free application of the actual cautery over the diseased bone, at as early a period of the disease as possible ; and this treatment may be conjoined with the bi-chloride of mercury, in small doses, given either in or accompanied with the decoction of sarsaparilla.

If it happens that no fair prospects of success from the benign influence of medicine, or the local applications enumerated, in restoring the former structure of the part, or even of checking the fatal progress of the complaint, can be in a case of Osteo-aneurism reasonably entertained, the Surgeon has then the choice of other measures.

Of these, one is the *Ligature* of the principal Arterial

trunk. The credit of having first indicated this mode of treating Osteo-Aneurism, is due to DUPUYTREN, who employed it under the idea of its being the only curative means compatible with the preservation and retention of the limb. The ligature has, in the hands of that able and dexterous surgeon, for a time arrested the disease; and indeed, if the Arteries of the Osseous Tissue present a true dilatation, or "*Arteriectasia*," as MECKEL terms it, it is natural to conclude that ligature of the principal trunk of those vessels would, in all cases, be efficacious.

In favour of the ligature, it may further be urged, that frequently the bloodvessels composing the disease come off from seldom more than one principal arterial branch; or if from more branches, these constantly derive their origin from the same trunk; the reverse of what occurs in Aneurism from Anastomosis, the vessels composing which are derived from different trunks—and hence the impossibility of effecting the cure of the latter disease by the means now under discussion.

But there are, on the other hand, strong arguments against the use of the ligature, and such, I fear, as to render this measure for the most part utterly inadmissible. In the first place, when disorganization of the osseous tissue has advanced any length, and a considerable degeneration of structure in the surrounding parts has taken place, the difficulty of the cure will be very great, even when the Aneurismal character of the complaint is removed by the ligature. In the next place, when Osteo-Aneurism affects such bones as the Scapula, which are supplied by more than one arterial trunk, the ligature is unsuitable; and, lastly, from cases of Osteo-Aneurism so treated, we have seen, that the disease, though kept at bay for a while, still, having been once fairly formed, the peculiar action of the vessels com-

posing it appears to be never wholly altered, but, owing to numerous vascular communications about the tumour, the vigour of the circulation is, after no long time, restored to the active condition it held before the employment of the ligature. Such restoration of this dismal disease is indicated by the unhealthy appearance of the wound, and by the effusion of arterial blood from the tumour at various times, which accordingly proceeds in its growth more or less rapidly to its fatal termination.

It is important, then, to observe, what appears indeed from facts and analogical deduction *, that, if the ligature is to be had recourse to at all, the only suitable time for employing this means of cure is in the very first stage of the malady; for then only can it afford the chance of being efficacious in saving the limb.

Excision of diseased parts,—an important branch of surgery—(one for the adaptation of which to the effectual cure of some carious joints, where previously never employed, the profession acknowledges itself indebted to the boldness of Professor SYME †), has been regarded as an advisable method, in some instances, of removing Osteo-Aneurism; but the circumstances of the case must be very favourable, indeed, to incline one to undertake such an operation. In order to render extirpation practicable, it is necessary the attempt be made at a very early stage in the growth of the tumour, as then only does this measure hold out a prospect of success; for when the disease has extended, the chance of recovery is greatly diminished.

* HODGSON (op. cit. Sect. iv. p. 266.) has indisputably proved, that every delay in employing the ligature in *Aneurism* diminishes the probability of success.

† Edin. Med. and Surg. Journal, vols. xxxi. p. 256; xxxii. 235; xxxiii. 233; xxxiv. 16; xxxv. 241; xxxvii. 328.—Also SYME on the Excision of Carious Joints, Edin. 8vo, 1831.

As to the circumstances of the case in which Excision may be accounted an advisable operation, this measure is proper only in the rare occurrence of the tumour being altogether insulated in its form, and limited in its growth, as when it affects a small bone, and when it is solid, firm, and unaccompanied by disease of the surrounding parts. If this operation be determined on, we must remove the whole bone in which the disease is seated, in order to succeed in eradicating the disease; thus carrying our incision beyond the verge of the tumour, for in this way, (just as in Aneurism from Anastomosis of the soft parts) we lessen the number of branches to be divided. Nevertheless, owing to the difficulty of Diagnosis, it is seldom we can detect Osteo-Aneurism at a time when Excision can be available.

Lastly, in those dismal cases where the tumour is so very large, its daily progress in size so great as to show that considerable disorganization has taken place in the various structures of the part where the tumour is situated, and the seat of the disease is such as not to allow of Extirpation—then the employment of Amputation affords the only remaining chance of success.

When *Amputation* has been fully determined on, it must be held in mind that it is necessary to remove entirely the bone which is the seat of the morbid alteration; since we have seen, from what happened in the sequel of the cure of those patients whose cases have been related, as well as from other considerations that have been already advanced, that this disease propagates itself through the cancelli from one extremity of the bone to the other. If the patient's consent in favour of the employment of this sole resource for saving his life has been obtained, it is proper to urge eagerly the immediate performance of the operation; since, in every case, the sufferer is so much reduced by his pre-

vious misery, that, if this single remedy be delayed, he quickly sinks. However, when Osteo-Aneurism occupies such a situation as renders the complete removal of the diseased bone an impracticable measure, the case of the unfortunate patient must be resigned as irremediable.

FINIS.

